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SCOTTISH

CRYPTOGAMIC FLORA.

SCOTTISH

CRYPTOGAMIC FLORA,

OR

COLOURED FIGURES AND DESCRIPTIONS OF CRYPTOGAMIC PLANTS, BELONGING CHIEFLY TO THE ORDER *FUNGI;*

AND

INTENDED TO SERVE AS A CONTINUATION

OF

ENGLISH BOTANY.

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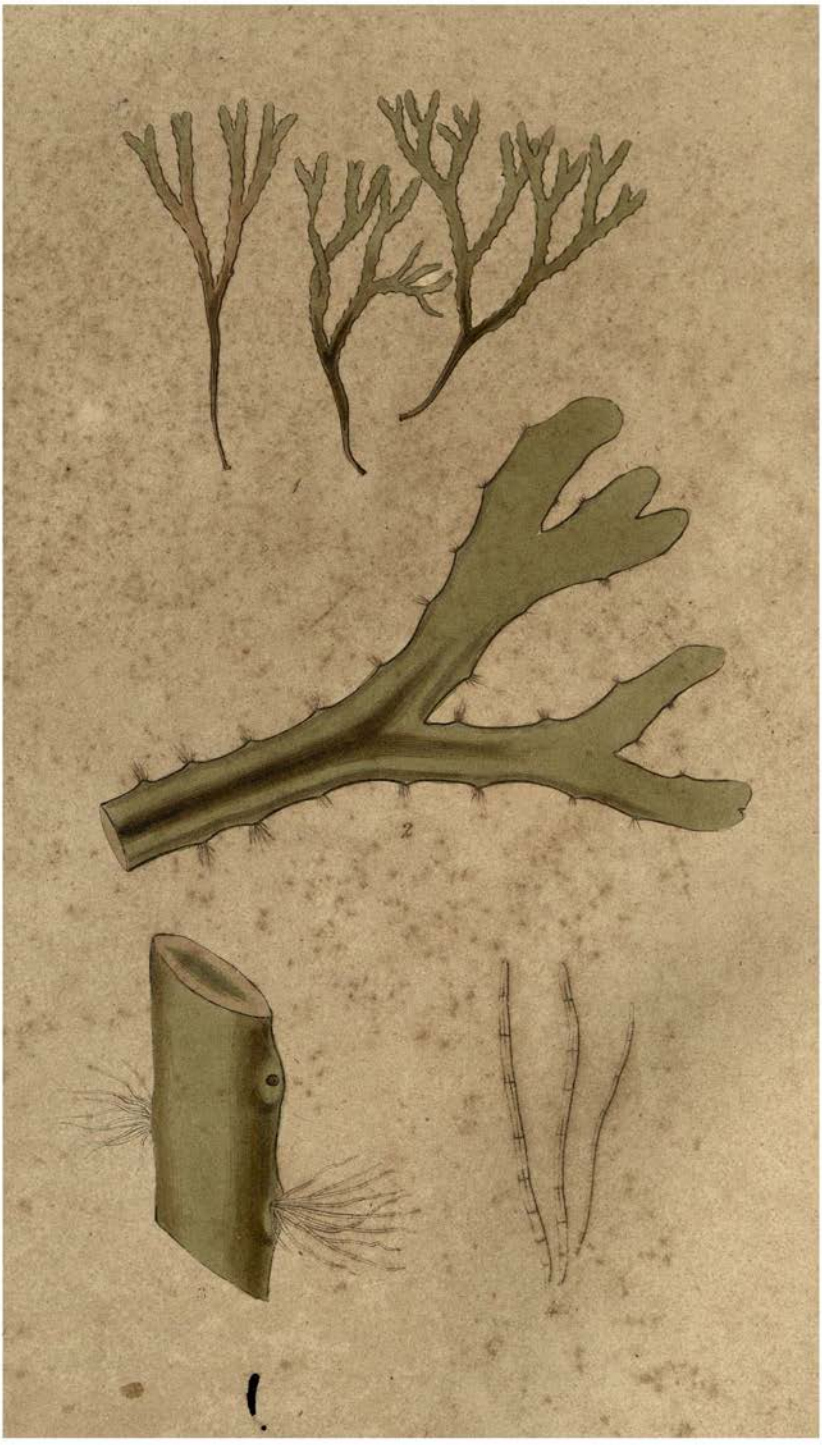


FUCUS BALTICUS.

Dwarf ribless Fucus.

CLASS AND ORDER CRYPTOGAMIA ALGÆ, *Linn.*—NAT. ORD. *ALGÆ, De Cand. Grev.*

GENERIC CHARACTER.

"*Receptacula tuberculata; tuberculis pertusis, includentibus glomerulos fibrarum capsulorumque massæ mucosæ fibrosæ immersos.*"—AG. *Radix scutata. Frons aut filiformis aut plana. Color olivacea.*

Receptacles tuberculated. Tubercles with a pore, containing fibrous bodies of a round form, along with capsules, immersed in a mucose-fibrous mass.—Root scutate. Frond either filiform or plane. Colour olivaceous.

SPECIFIC CHARACTER.

FUCUS balticus; *fronde plana, minuta, subcostata, angustissime lineari, dichotoma, integerrima, evesiculosa, margine subtuberculata.*

F. frond plane, minute, nearly without any midrib, extremely narrow, linear, dichotomous, entire, without vesicles, somewhat tuberculated at the margin.

FUCUS balticus, *Ag. Dec.* No. 21.—*Sv. Bot.* t. 516. figs. a, b, c, e.
FUCUS vesiculosus, var. subcostatus, *Ag. Syn.* p. 5.—*Lyngb. Hydroph.* p. 3. *Ag. Sp. Alg.* v. 1. p. 91.

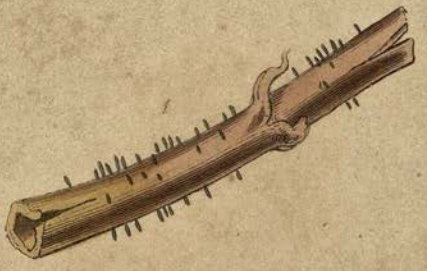
HAB. Sea shores. At Dunstaffnich Castle, nearly at high-water mark, and on the island of Kerera, Mr MAUGHAN. Appin, Captain CARMICHAEL. Island of Arran, Dr HOOKER.

Root, a minute scutate base. *Frond* 1–2 inches in height, not 2 lines in breadth, linear, plane, nearly ribless, or found to be very obscurely furnished with a midrib when held between the eye and the light, 2–4 times dichotomous, opake, olivaceous green towards the extremity, below reddish or dark brown; the margin somewhat tuberculated, which appearance is evidently caused by the *pore-like orifices* from which the white confervoid filaments issue, and which are so numerous on the surface of the frond in *Fucus vesiculosus*, being here found at the margin. There is not the least trace of *vesicles* or fructification upon any of the numerous specimens in my possession.

From all that is at present known respecting this curious little Alga, it would be imprudent to assert positively its claim to rank as a distinct species. Professor AGARDH, unquestionably the first Hydrophytologist in the world, regards it as a variety of *Fucus vesiculosus*, in which he is strongly borne out by the known polymorphous nature of that species. The absence of both vesicles and fructification must, however, leave this point in uncertainty. AGARDH, in his view of the question, looks upon the tuberculated appearance of the margin to arise from the rudiments of vesicles, "Tubercula marginalia opposita, rudimenta vesicularum." Upon accurate examination, however, these tubercles are found not to be opposite (which they ought to be, if vesicles), but arranged very irregularly, and are in reality the orifices from which minute bundles of white filaments are protruded, similar to those plentifully dispersed over the frond of *Fucus vesiculosus*. In the present instance, these orifices (having a somewhat thickened margin) are mostly confined to the extreme edge of the frond, and give it a peculiar appearance to the naked eye. Towards the upper part of the plant, the midrib seems to be wholly wanting, but traces of it may certainly be found lower down.

This plant was first communicated to me by Mr MAUGHAN in 1816, and since by my friends Captain CARMICHAEL and Dr HOOKER. Mr MAUGHAN's specimens were gathered in December.

Fig. 1. *Plants, nat. size.* Fig. 2. *Upper part of a frond, magnified.* Fig. 3. *Portion of a frond, to shew the marginal pore-like orifices, with the bundles of filaments.* Fig. 4. *The filaments.—All except* Fig. 1. *magnified.*



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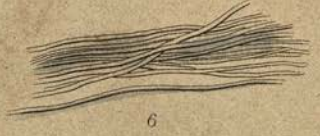

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ACROSPERMUM COMPRESSUM.

Dark narrow-stemmed Acrospermum.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *GASTROMYCI? Grev.*

GENERIC CHARACTER.

Receptaculum elongatum, subclavatum, subcartilagineum, sæpe stipitatum, intus subhomogeneum, apice demum subtumens, e sporidiis pruinoso.

Receptacle elongated, subclavate, somewhat cartilaginous, often furnished with a stipes, within subhomogeneous; apex at length becoming somewhat tumid and pruinose from the sporidia.

SPECIFIC CHARACTER.

ACROSPERMUM compressum; *stipitatum, plerumque lanceolatum, obtusiusculum, subcompressum, nigrescente-olivaceum.*

A. stipitate, mostly lanceolate, somewhat obtuse, subcompressed, of a dark olivaceous colour.

ACROSPERMUM compressum, *Tode, Fung.* 1. p. 8. t. 2. f. 13.—*Fries, Syst.* v. 1. p. 245.

CLAVARIA Herbarum, *Pers. Comment.* p. 68. t. 3. f. 4.—*Syn. Fung.* p. 605. *Sow. Fung.* t. 353.—*Alb. et Schwein.* p. 291.—*De Cand. Fl. Franç.* v. 6. p. 30.—*Schmidt et Kunze, St. Exsicc.* No. 69.—*Purt. Midl. Fl.* v. 3. p. 331. t. 19. f. 3.—*Schwein. Fung. Carol.* No. 1109.

HAB. On the dead stems of the larger herbaceous plants, and even on dead leaves. Autumn. River side, near Lasswade.—SOWERBY's figure is taken from specimens collected by Mr GIBBS, in Devonshire; and it has been since found by Mr BAXTER on dead nettle-stems on Shotover Hill near Oxford.

Minute, 1–2 lines high, erect, shortly stipitate, then swelling out, and again becoming attenuated towards the apex, and varying from oblong to lanceolate, of a dark greyish-brown, or olivaceous colour, slightly pellucid, and smooth when moist, in drying becoming longitudinally sulcate, and much sharper at the point. When mature, the apex is slightly concentrically rugose, pale, and pruinose from the evolved sporidia, according to TODE and FRIES. The *stipes* is short and cylindrical, the remainder somewhat compressed, but most so when dry. *Substance* cartilaginous, very firm, and even corneous in the dry state. The interior in my specimens, apparently composed of a dense mass of filaments, longitudinally disposed, and passing towards the base into a firm uniform substance. I have never been able to detect the sporidia.

Acrospermum was first established as a genus by TODE in his "Fungi Mecklenburgenses selecti," with the character "Fungus simplicissimus, suberectus, apice extus fructificante." It only differs from *Sclerotium*, according to the correct observation of FRIES, in the fructification being confined to the apex.

In the perfectly recent state in which I examined this plant, it appeared to me, that the outer substance formed a nearly distinct covering to the interior mass, which, again, seemed to be composed of a dense mass of pale filaments, not furnished with any joints. Some of these filaments it was no difficult matter to remove from their situation; and then, as most distinctly seen, I drew the Fig. 6. in the annexed plate. I am sorry, that, with all my care, I have never been able to find the sporidia, though, from the combined authority of TODE and my friend FRIES, there can be no doubt of their existence.

Fig. 1. *Plants, nat. size.* Fig. 2. *Plants in a moist state.* Fig. 3. *One in a dry state.* Fig. 4. *A longitudinal section.* Fig. 5. *A transverse section.* Fig. 6. *Filaments from the interior.—All magnified except* Fig. 1.

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BOLETUS LUTEUS.

Common yellow Boletus.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *FUNGI, Link, Grev.*

GENERIC CHARACTER.

Pileus carnosus, stipite centrali. Hymenium tubulosum a pileo discretum et distinctum, tubulisque discretis connexis.

Pileus carnose, furnished with a central stipes. Hymenium tubular, of a distinct substance from the pileus: the tubes also distinct from, but in contact with, each other.

SPECIFIC CHARACTER.

BOLETUS luteus; *pileo glutine fusco, secedente, oblinito; tubulis adnatis, rotundis, luteis; stipite firmo, annulato, apice punctato.*—FRIES.

B. pileus smeared with a fuscous slime, which gradually disappears; tubes adnate, round, yellow; stipes firm, with an annular veil, and dotted at the top.

BOLETUS luteus, *Linn. Fl. Suec.* 1247.—*Sp. Pl.* 1646.—*Schœff. Fung.* t. 114.—*Sow. Fung.* t. 265.—*Huds. Fl. Angl.* p. 627.—*Relh. Fl. Cantab.* ed. 3. p. 545.—*Wahl. Fl. Lapp.* p. 530.—*With. Bot. Arr.* ed. 6. v. 4. p. 382.—*Winch, Bot. Guide,* 2. p. 95.—*Fries, Obs.* 2. p. 242.—*Syst.* v. 1. p. 386.—*Hook. Fl. Scot.* pt. 2. p. 27.—*Grev. Fl. Edin.* p. 403.

BOLETUS annulatus, *Pers. Syn.* p. 503.—*Fl. Dan.* t. 1135.—*Alb. et Schwein.* p. 238.—*Nees, Syst.* t. 26. f. 204.—*Schwein. Fung. Carol.* No. 854.

BOLETUS annularius, *Bull. Champ.* t. 332.—*Bolt. Fung.* t. 169.—*De Cand. Fl. Franç.* ed. 3. v. 2. p. 127.—*Ejusd. Syn.* p. 26.

BOLETUS flavus, *With. Bot. Arr.* ed. 6. v. 4. p. 384.

BOLETUS cortinatus, *Pers. Syn.* p. 503.

BOLETUS decurrens, *Schum. Sælland.* p. 373.

BOLETUS elegans, *Schum,* l. c. p. 374.

HAB. In woods and upland pastures, plentiful, in the autumn.

Pileus 2–4 inches broad, convex, smooth, covered with a glutinous substance, which gradually disappears, of a tawny or yellow colour, often irregularly spotted, and with a reddish tinge. *Tubes of the hymenium* yellow, decurrent, and adnate with the stipes, the orifice minute, uniform. *Flesh* thick, pale yellowish, scarcely changing on being cut. *Stipes* solid, 2–4 inches long or more, firm, half an inch or more in diameter, somewhat attenuated upwards, or subequal, pale towards the upper part, especially above the veil, where it is generally dotted. Be-

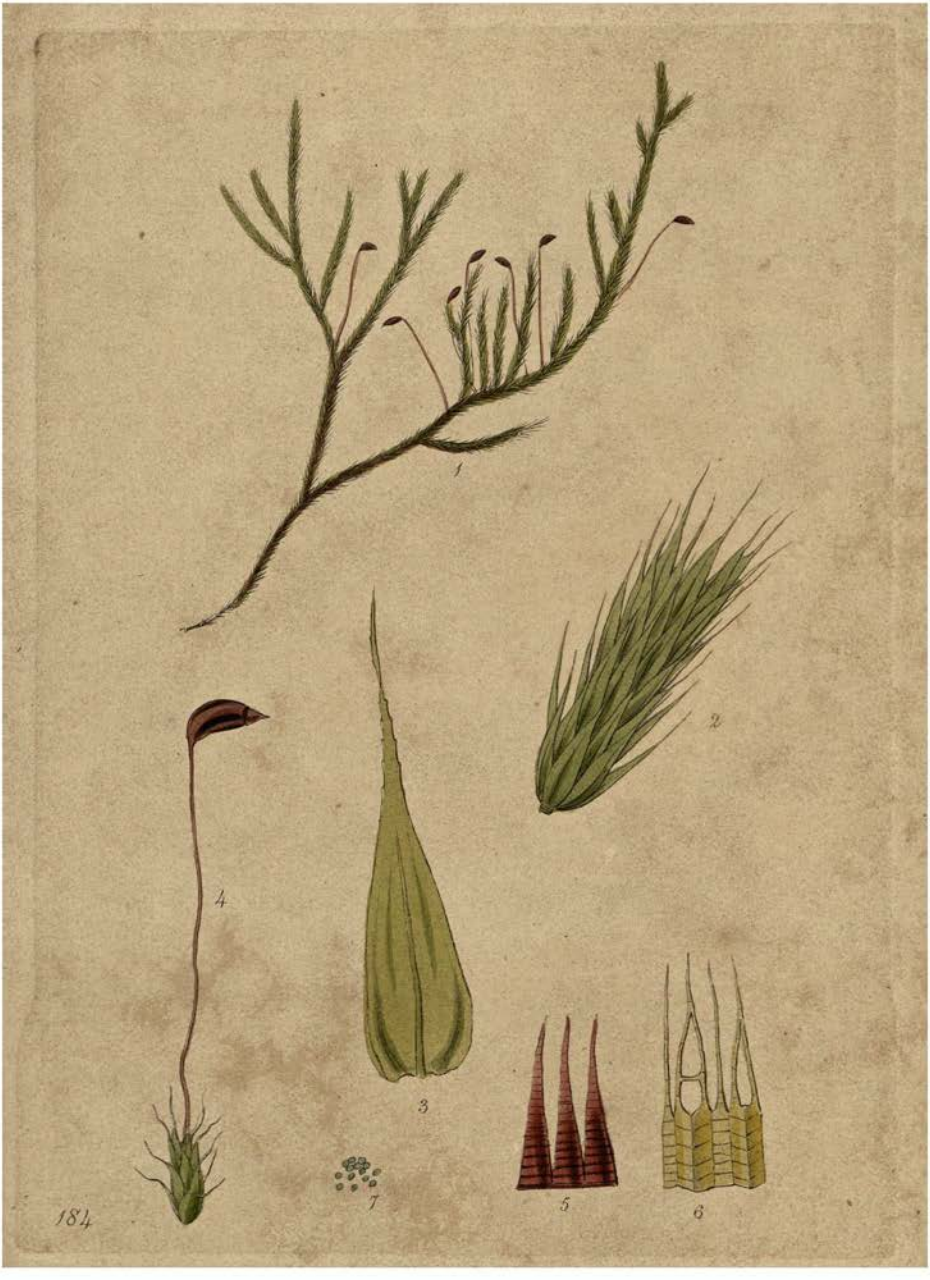
low, it is usually more or less streaked or stained with dull red. *Veil* very conspicuous, passing in the young state from the margin of the pileus to the stipes, to which it afterwards remains more or less attached. *Sporidia* reddish-yellow, oval.

This is the only species in Great Britain furnished with a distinct veil; and though it varies considerably in the intenseness of the colour of the pileus, it is nevertheless one of the best distinguished of the whole genus. In the Highland districts of Scotland, where it grows in the utmost profusion, I have repeatedly noticed, that, in moist and very shady situations, the pileus is paler, and of a purer yellow colour; and that when it is exposed to the sun, or, especially when it occurs on the mountains, as it occasionally does at an elevation of 1000 or 2000 feet, the pileus becomes dark tawny.

In rainy weather, and always in the early state, the pileus is quite covered with a slimy fluid, which becomes gradually inspissated: this sometimes seems to disappear entirely; at others, it becomes dried by the heat of the sun, and resumes its slimy character after exposure to rain or dew.

The veil is annular, surrounding the stipes like a collar, which is sometimes very perfect: it often, however, shrinks up, or tearing irregularly, leaves the remains like a mere ring on the stipes, but at all times sufficient to indicate its previous existence.

Fig. 1. *A mature plant.* Fig. 2. *A young plant, with the veil entire.* Fig. 3. *A section.* Fig. 4. *The tubes, showing their capability of separation from the pileus and each other.* Fig. 5. *Sporidia.—The two last magnified.*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HYPNUM SALEBROSUM.

Smooth-stalked shining Feather-moss.

CLASS AND ORDER CRYPTOGAMIA MUSCI, *Linn.*—NAT. ORD. *MUSCI, Juss. &c.*

GENERIC CHARACTER.

Seta lateralis. Peristomium duplex: ext. *e dentibus* 16: int. *membrana plicata,* 16-*laciniata, ciliis alternantibus. Calyptra dimidiata.*—HOOK.

Fruitstalk lateral. Peristome double: the outer one of 16 teeth; the inner one of a plicate membrane, cleft into 16 segments, with ciliary processes between them. Calyptra dimidiate.

SPECIFIC CHARACTER.

HYPNUM salebrosum; *caule decumbente, subpinnato vel vagè ramoso; foliis erectiusculis, lanceolatis, longe acuminatis, striatis, apicem versus serrulatis, nervo ultra medium evanescenti; seta lævi; theca cernua, operculo acute conico.*

H. stem decumbent, somewhat pinnate or irregularly branched; leaves nearly erect, lanceolate, with a long acumination, striate, serrulate toward the apex, the nerve disappearing beyond the middle; fruitstalk smooth; capsule cernuous, the lid acutely conical.

HYPNUM salebrosum, *Hoffm. Fl. Germ.* 2. p. 74.—*Web. & Mohr, Tasch.* p. 312.—*Schwaegr. Suppl.* I. pt. 2. p. 237.—*Moug. et Nestl. St. Exsicc.* No. 428.—*Funck, Deutschl. Moose,* p. 60. t. 42.—*Drummond, Musci, Scot.* v. 2. No. 68.

HYPNUM plumosum, *Hedw. St.* vol. 4. t. 15. exclud. synon.

HAB. Rocks, walls, and on the ground. Near the Loch of Forfar, Mr DRUMMOND.

Stems growing in rather dense masses, decumbent, 2–6 inches long, irregularly branched, the branches erect, set with numerous ramuli, either in an irregular or somewhat pinnate manner. *Leaves* numerous, shining green, nearly erect, lanceolate, with a long, almost hair-like acumination, the acuminated portion only, subserrulate: towards the base, they are furnished with two principal striæ; nerve disappearing above halfway up. *Perichætial leaves* somewhat spreading. *Fruitstalk* about three-fourths of an inch in length, smooth. *Capsule* cernuous, shortly ovate, dark red, the *lid* acutely conical. *Peristome: outer one* of 16 red teeth, becoming paler at their extremity: *inner one* of a membrane cleft into 16 lacunose segments, with alternating filiform processes as long as the segments.

From the observations of the excellent authors of the Muscologia Britannica, it appears extremely probable that we are indebted to Mr HOBSON of Manchester for the original discovery in Great Britain of *Hypnum salebrosum*, though the moss communicated to them by that naturalist had lost the operculum. That it is now a native of at least Scotland, is placed beyond a doubt, from the fine specimens which that successful cryptogamist Mr DRUMMOND has had the good fortune to discover in the neighbourhood of Forfar, and which he has published in the second volume of his valuable "Musci Scotici."

To *Hypnum lutescens, nitens*, and *albicans*, our present species is most nearly allied; but from the first, it is separated by its smooth fruitstalk, and slightly serrulate acumination of the leaves:—from the second, it is removed by the shorter nerve, much shorter capsule, and by the absence of the red tomentosity on the stems, and cuspidate form of the extremity of the branches;—from the third, it differs in its darker colour, serrulated apex of the leaves, less erect and more compound mode of growth, and acutely conical operculum. The general habit of *H. lutescens* comes nearest to that of *H. salebrosum*. *H. nitens* is erect, more robust, the branches shorter, the fruitstalk much longer, and the whole of a more golden, yellow shining colour. *H. albicans* is generally nearly quite erect, with few and mostly simple branches, of a pale whitish-green colour.

Fig. 1. *H. salebrosum, nat. size.* Fig. 2. *Portion of a branch.* Fig. 3. *Perichœtium, fruitstalk and capsule.* Fig. 5. *Portion of the outer peristome.* Fig. 6. *Portion of the inner ditto.* Fig. 7. *Sporules.—All magnified except* Fig. 1.

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GEOGLOSSUM HIRSUTUM.

Hairy Earth-tongue.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *FUNGI, Link, Grev.*

GENERIC CHARACTER.

Hymenium breve, claviforme, stipitatum, plerumque compressum, a stipite subdistinctum, sed vero discretum.—Genus colore nigricante vel obscure viridi.

Hymenium short, club-shaped, furnished with a stipes, mostly compressed, somewhat confluent with the stipes, but truly distinct.—Colour of the whole genus blackish or dull green.

SPECIFIC CHARACTER.

GEOGLOSSUM hirsutum; *hirsutum nigrum.*

G. hairy, black.

GEOGLOSSUM hirsutum; *Pers. Comment.* p. 37.—*Syn. Fung.* p. 608.—*Mycol. Europ.* v. i. p. 194.—*Alb. et Schwein.* p. 294.—*Nees' Syst.* t. 17. f. 157.—*Schmidt et Kunze, St. Exsicc.* No. 122.—*Moug. et Nestl. St. Exsicc.* No. 94.—*Schwein. Fung. Carol.* No. 1114.—*Fries. Syst.* v. 1. p. 488.—*Grev. Fl. Edin.* p. 416.

CLAVARIA ophioglossoides, *Schmid. icon.* t. 25.—*Holmsk. Coryph.* p. 18. cum icone.—*Sow. Fung.* t. 83.—*Schæff. Fung.* t. 327.—*With. Bot. Arr.* v. 4. p. 435.—*Purt. Midl. Fl.* v. 3. p. 472.

HAB. In moist grassy places, not unfrequent.

Entire plant 2–3 inches high, scattered, erect, black. *Stipes* covered with short black hairs, cylindrical, straight or crooked, solid, of a paler colour within. *Hymenium* distinct from the stipes, but appearing to pass into it, plicate towards its base, somewhat compressed, of an oblong, ovate, or even sometimes roundish figure. *Fructification* the same as in *G. viscosum.*

The hairy stipes with which this plant is furnished, is a sufficient mark of distinction; no other species having been yet found to possess a similar character.

Fig. 1. *Plants, nat. size.* Fig. 2. *A section.* Fig. 3. *A small portion of the hymenium.* Fig. 4. *Thecæ and Paraphyses (barren filaments).* Fig. 5. *Sporidia?—All but the two first magnified.*

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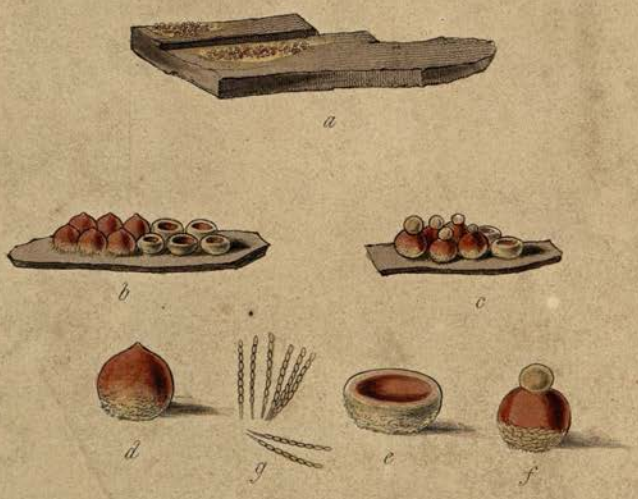


SPHÆRIA AFFINIS.

Red mouthless Sphæria.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *HYPOXYLA, De Cand. Grev.*

GENERIC CHARACTER.

Receptaculum 0. *Perithecia cornea, libera, sessiles aut subimmersa, sparsa vel congesta, ore interdum elongato, aliquando nullo; intus massa gelatinosa sporulifera instructa.*

Receptacle 0. Perithecia corneous, free, sessile, or somewhat immersed, scattered or crowded, the mouth sometimes elongated, at others wanting. Interior filled with a gelatinous sporuliferous mass.

SPECIFIC CHARACTER.

SPHÆRIA affinis; *subgregaria vel sparsa, sessilis, aurantiaca, lævis, globosa, astoma, basi albida, filamentosa.*

SPH. subgregarious or scattered, sessile, orange coloured, smooth, globose, destitute of orifice, whitish and filamentous at the base.

HAB. Parasitic on the branches of *Bangia atrovirens*, LYNGB. (*Cornicularia pubescens* of ACHARIUS) in autumn. Appin, Captain CARMICHAEL.

Perithecia very minute, yet sufficiently evident to the naked eye, irregularly scattered on the stems and branches of *Bangia atrovirens:* each in the early state covered by a web of whitish filaments, which, in maturity, remain at the base, and seem to assist in their attachment. When fully grown, the perithecia are of a globose figure, an orange colour, and smooth surface, without any trace of an orifice, and not, as I have observed, disposed to collapse like those of *Sphæria Peziza*, and several others. *Thecæ* large for the size of the perithecia, intermixed with a few paraphyses (or barren filaments). *Sporidia* large, mostly oblong, simple, or once or even twice jointed.

Respecting this interesting little species, its estimable discoverer Captain CARMICHAEL has favoured me with some observations, which I cannot do better than give in his own words: "Besides its intrinsic beauty, it is curious, as being possibly the plant figured in "English Botany" as the fructification of *Lichen pubescens* (*Bangia atrovirens*, LYNGB.) This is merely a conjecture of my own, founded upon external appearance. The fructification, as represented in the figure is hemispherical, to be sure, or rather cupular; but this form may have been the result of collapsion. Should I be wrong in my conjecture, you will allow it to be a very uncommon circumstance, that a fungus of the same size and colour should be

found growing on the same plant." This conjecture I cannot but acknowledge to be highly probable; and it derives additional support from our knowledge of the structure of the *Lichen pubescens*, which is that of an Alga; and consequently the fructification delineated in the excellent "English Botany," cannot actually have belonged to that plant.

Fig. 1. a, *Bangia atrovirens, with Sphæria affinis, nat. size.* b, *A branch with perithecia, magnified.* c, *A perithecium.* d, *Thecæ and sporidia.—All magnified except the first.*

SPHÆRIA PEZIZA.

Red collapsed Sphæria.

SPECIFIC CHARACTER.

SPHÆRIA Peziza; *gregaria, mollis; peritheciis globosis, lævibus, subpapillatis, aurantiaco-rubellis, collabescendo, concavis, basi subpilosis.*

SPH. gregarious, soft; perithecia globose, smooth, orifice subpapillate, orange-red, becoming concave from collapsion, subpilose at the base.

SPHÆRIA Peziza, *Tode, Fung.* 2. p. 46. f. 122.—*Pers. Syn.* p. 66.—*Alb. et Schwein.* p. 34.—*De Cand. Fl. Franç.* v. 2. p. 295.—*Ejusd. Syn.* p. 61.—*Fries, in Vet. Ac. Handl.* 1817, p. 264.—*Scl. Suec. Exsicc.* No. 235.—*Syst. Mycol.* v. 2. p. 452.—*Moug. et Nestl. Stirp. Exsicc.* No. 483.—*Nees, Syst.* t. 44. f. 361.—*Hook. Fl. Scot.* pt. 2. p. 7.—*Grev. Fl. Edin.* p. 363.—*Schwein. Fung. Carol.* No. 167.

SPHÆRIA miniata, *Hoffm. Bot. Taschenb.* 2. t. 12. f. 2.

PEZIZA hydrophora, *Bull. Champ.* p. 245. t. 410. f. 2.

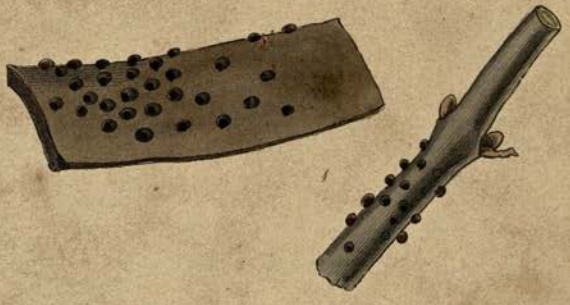
LYCOPERDON hydrophorum, *Sow. Fung.* t. 23.

HAB. On rotten wood in autumn and spring. Occasionally about Edinburgh.

Perithecia gregarious, minute, globose, smooth, with a slightly papillate orifice, orange-red, of a soft substance, and becoming at length collapsed, and concave like a *Peziza*. The base is paler, and somewhat villose. In one variety, named var. *globifera* by FRIES, the interior mass of fructification, of a white colour, is exuded, and assumes the form of a little gelatinous ball. *Thecæ* very slender, filled with 6–10 oval *sporidia*, of a yellow colour.

A beautiful and by no means common species, usually produced on moist wood, in a state of great decay. SOWERBY erroneously imagined that it resembled *Sphærobolus stellatus* in its structure, from the general appearance of the globiferous variety.

Fig. 2. a, *Sphæria Peziza on a piece of wood, nat. size.* b, *Perithecia, some of them collapsed.* c, *Perithecia of the globiferiferous variety.* d, *A perithecium.* e, *The same collapsed.* f, *A globiferous perithecium.* g, *Thecæ containing sporidia.—All magnified except the first.*



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TUBERCULARIA GRANULATA.

Rough dull-red Tubercularia.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *GASTROMYCI, Link.*

GENERIC CHARACTER.

Receptaculum subglobosum, sessile vel brevi-stipitatum, carnoso-vesiculosum. Sporidia in ambitu dispersa.—Substantia nunquam gelatinosa. Color plerumque ruber.

Receptacle subglobose, sessile or shortly stipitate, carnoso-vesiculose. Sporidia contained in the circumference.—Substance never gelatinous. Colour mostly red.

SPECIFIC CHARACTER.

TUBERCULARIA granulata; *subrotunda, brevissime stipitata, sordide rubra, demum nigrescens, superficie rugoso-tuberculosa.*

T. somewhat round, very shortly stipitate, dull red, at length black, the surface rugoso-tuberculose.

TUBERCULARIA granulata, *Pers. Syn. Fung.* p. 113.—*Alb. et Schwein.* p. 69.—*De Cand. Fl. Franç.* v. 6. p. 109.—*Fries, Sclerom. Suec. Exsicc.* No. 257.—*Schwein. Fung. Carol.* No. 296.—*Nees' Syst.* t. 2. f. 32.

HAB. On dead branches of various trees, rare. I have found it occasionally near Edinburgh in the autumn.

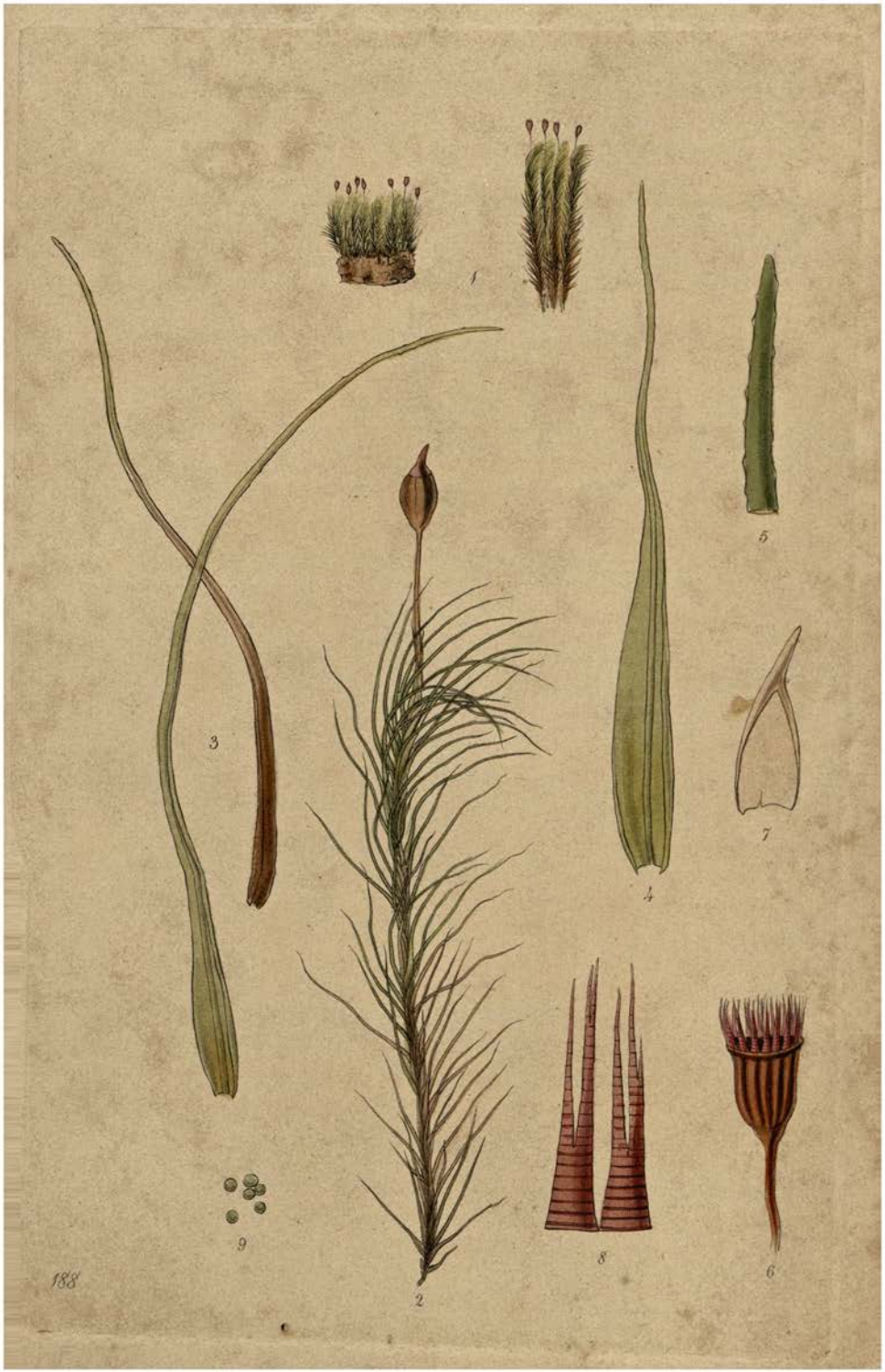
Gregarious, about a tenth or twelfth of an inch in diameter, roundish, furnished with a very short stipes. *Colour* a dull red, changing at length to nearly black. *Surface* between rugose and tuberculose, or rugose with a few scattered tubercular prominences. *Sporidia* oval.

Tubercularia is a genus extremely natural in the habit of its species, and at the first glance not liable to be mistaken for any other. All the species are of a roundish determinate form, and all that I am acquainted with are composed of two substances; the one forming a sort of nucleus, passing downwards, and attaching the plant to the substance on which it grows; the other spreading over the summit of the nucleus, and more or less projecting at the margin like a rounded pileus. The nu-

eleus has a fibrous structure, and appears quite distinct from the exterior, which is of a softer nature, formed nearly entirely of the mass of fructification, and frequently almost melting away when placed in water.

Besides the present species, *Tubercularia vulgaris, confluens,* and *discoidea,* have been discovered in this country.

Fig. 1. *T. granulata, nat. size.* Fig. 2. *Plants magnified.* Fig. 3. *A vertical section.* Fig. 4. *A portion of the fructification.—All but* Fig. 1. *magnified.*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DICRANUM FULVELLUM.

Tawny Dicranum.

CLASS AND ORDER CRYPTOGAMIA MUSCI, *Linn.*—NAT. ORD. *MUSCI, Juss. &c.*

GENERIC CHARACTER.

Seta terminalis. Peristomium simplex e dentibus 16 *bifidis. Calyptra dimidiata.*—HOOK.

Fruitstalk terminal. Peristome simple, of 16 bifid teeth. Calyptra dimidiate.

SPECIFIC CHARACTER.

DICRANUM fulvellum; *cæspitosum; caule simpliusculo; foliis longissimis subulato-setaceis, ad apicem vix subserrulatis nervo obsoleto-percurrente; seta brevis; theca obovata, erecta, striata, operculo brevi-rostellato.*

D. tufted; stem nearly simple; leaves very long, subulato-setaceous, scarcely subserrulate at the apex, nerve obsoletely percurrent; fruitstalk short; capsule obovate, erect, striated, the lid shortly rostrate.

DICRANUM fulvellum, *Smith, Fl. Brit.* p. 1209.—*Engl. Bot.* t. 2268.
DICRANUM rupestre, *Web. & Mohr, Tasch.* p. 185. et 469.
BRYUM fulvellum, *Dicks. Crypt. Fasc.* 4. t. 11. f. 1.

HAB. Crevices of rocks, Ben More, Mr DICKSON. Ben Nevis, Mr BORRER. Ben Lawers in 1823, Dr HOOKER and Dr GREVILLE. Mountains of Clova, Mr DRUMMOND.

Stems densely tufted, half an inch to above an inch in length, nearly simple, slender, erect. *Leaves* very long, subulato-setaceous, the very extremity slightly subserrulate, and furnished with a nerve, which becomes gradually obsolete towards the summit. At the base, the leaves are shorter, and point in every direction; but towards the summit they are greatly lengthened out, and usually more or less directed to one side; their colour is a tawny shining green. *Perichætial leaves* oblongo-lanceolate, with an elongated setaceous point. *Fruitstalk* two or three lines long, straight, erect. *Capsule* reddish, erect, when moist obovate, striated: when dry, cyathiform, furrowed, the orifice very large. *Lid* hemispherical, with a short, slightly oblique beak. *Peristome* of 16 bright deep-red linear-lanceolate teeth, very irregularly cleft, and occasionally even lacunose, inflexed at the summit. *Calyptra* dimidiate, pale.

This species, which seems to be peculiar to alpine districts, has become better known since its re-discovery in the Scottish Highlands. DICKSON was the first to find and describe it, although under the generic name of *Bryum*. Sir J. E. SMITH, in his "Flora Britannica," and afterwards in his noble work the "English Botany," placed it among the *Dicrana*, to which it truly belongs. WEBER and MOHR, in the mean time, described a German moss under the name of *Dicranum rupestre*, which we have no hesitation whatever in regarding as our present plant, (though expressly stated by those acute botanists to be distinct from it), their whole description agreeing in a remarkable manner. SCHWAEGRICHEN does not appear to have seen the plant at all, as he simply places it in a list of those doubtful species of which he does not venture to give any description.

In the "Muscologia Britannica," *Dicranum fulvellum* is considered the same as *Weissia acuta;* but I have little doubt, that, in the forthcoming edition of that excellent work, the perfect specimens now in the possession of the authors, will induce them to give it the place of a species.

Fig. 1. *Plants, nat. size.* Fig. 2. *A plant magnified, with the capsule and lid.* Fig. 3. *Cauline leaves.* Fig. 4. *Perichætial leaf.* Fig. 5. *Apex of a cauline leaf.* Fig. 6. *Capsule in a dry state, with the peristome.* Fig. 7. *Calyptra.* Fig. 8. *Two of the teeth of the peristome.* Fig. 9. *Sporules.*

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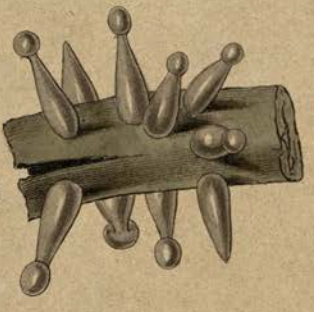
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SPHÆRONEMA SUBULATUM.

Awl-shaped Sphæronema.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *HYPOXYLA, De Cand.*

GENERIC CHARACTER.

Perithecium subglobosum vel elongatum, verticale, poro simplici apertum. Sporidia demum erumpentia et in globulum indurata.

Perithecium subglobose or elongated, erect, with a simple pore-like orifice. Sporidia at length bursting forth, and forming an indurated globule.

SPECIFIC CHARACTER.

SPHÆRONEMA subulatum; *peritheciis conico-subulatis, acutis, lutescentibus; subpellucidis, globulo pallido.*

S. perithecia conico-subulate, acute, yellowish, somewhat pellucid, the globule very pale.

SPHÆRONÆMA subulatum, *Fries, Syst.* v. 2. p. 536.—*Sclerom. Suec. Exsicc.* No. 325.

SPHÆRIA subulata, *Tode, Fung.* 2. p. 44. f. 117.—*Pers. Syn. Fung.* p. 94.—*Alb. et Schwein.* p. 52.—*De Cand. Fl. Franç.* v. 6. p. 137.—*Nees' Syst.* t. 43. f. 345.—*Schwein. Fung. Carol.* No. 232.

HAB. On hardened Agarics, in autumn, rare. Woods near Edinburgh. Near Tarbet, on the banks of Loch Lomond.

Perithecia often scattered over a whole fungus, minute, erect, conico-subulate, reddish or brownish at the base, yellowish upwards, subpellucid, smooth, furnished with a pore at the apex, by which the *sporidia* are at length gradually exuded, and assume the form of a little ball, which becomes hardened, and exists in that state for a great length of time. The perithecium is partly hollow, and contains the sporidia previous to maturity, mixed with a gelatinous pulp, and a few filaments, which, being evacuated along with the sporidia, were very obvious in several specimens I dissected; for, on exposure to moisture, the little ball dissolves very readily, and is an interesting object under a high magnifier. The *sporidia* are very minute.

Sphæronema is a genus established by FRIES in his excellent Systema, a work indispensable to every scientific lover of Mycology. He has described fifteen species; and the individual figured in the annexed plate, may be said to form the type of the genus. Most of them have elongated perithecia; but the most striking feature is the little ball produced by the sporidia, as they escape from the terminal pore. While in the perithecia, they are described by FRIES as contained in a delicate mucose sac, which I have not been so fortunate as to observe.

Fig. 1. *Plants on a dried Agaric, nat. size.* Fig. 2. *A group of perithecia magnified.* Fig. 3. *A perithecium with the terminal globule.* Fig. 4. *A perithecium before the escape of the sporidia, vertically divided.* Fig. 5. *A perithecium with the globule vertically divided.* Fig. 6. *A perithecium with the globule exposed to moisture, shewing the manner in which the sporidia are dispersed.* Fig. 7. *A globule, with the sporidiæ dispersing under the effect of moisture.* Fig. 8. *A globule, having lost all the sporidia, but with minute bristly filaments remaining attached to the orifice.* Fig. 9. *A summit of a perithecium previous to maturity, exuding its sporidia on the application of moisture.—All except* Fig. 1. *more or less magnified.*

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CLAVARIA CRISTATA.

Pale crested Clavaria.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *FUNGI, Link, Grev.*

GENERIC CHARACTER.

Plantæ carnosæ, plus minusve cylindraceæ, simplices vel ramosæ. Hymenium lævе, omnem fere superficiem occupans, cum stipite confluens. Sporidia albida vel ochracea.

Carnose plants, more or less cylindrical, simple or branched. Hymenium smooth, occupying almost the whole surface, and confluent with the stipes. Sporidia white, ochraceous.

SPECIFIC CHARACTER.

CLAVARIA cristata; *"cæspitosa, ramosa, lævis, glabra, albida dein fuliginea, ramis superne dilatatis cristatis acutis."*—FRIES.

CL. tufted, branched, smooth, glabrous, whitish, at length smoke-grey, the branches dilated upwards, crested, acute.

CLAVARIA cristata, *Pers. Syn. Fung.* p. 591.—*Alb. et Schwein.* p. 287.—*Fries. Syst.* v. 1. p. 473.—*Pers. Mycol. Europ.* 1. p. 166.—*Schwein. Fung. Carol.* No. 1082.—*Grev. Fl. Edin.* p. 413.

CLAVARIA fallax, *Pers. Comment.* p. 48.—*Fl. Dan.* t. 1304. f. 2.

CLAVARIA albida, *Schæff. Fung.* t. 170.

CLAVARIA nivea, *Pers. Comment.* p. 48. t. 2. f. 4.

RAMARIA cristata, *Holmsk.* 1. p. 92. *cum icone.*

HAB. In woods and moist shaded places. Balmuto in Fifeshire, and about Edinburgh.

Plant tufted, branched, 2–3 inches high, fleshy, rather firm, snow-white, whitish, or greyish, at length dingy or smoke-grey, solid, with a smooth and even surface, varying greatly in the degree of ramification; the branches more or less crested or fimbriated at their apex, and acute, very rarely abrupt and obtuse. *Sporidia* numerous, globose, white.

A very pretty species, somewhat allied to *Clavaria cinerea*, especially in the variable appearance frequently put on by the branches. One singular variety has the stem almost regularly infested with a minute black *Sphæria*.

Fig. 1. *A plant of Clavaria cristata, nat. size.* Fig. 2. *A portion of a stem transversely divided.* Fig. 3. *A portion of the hymenium, shewing the thecæ and sporidia, magnified.*

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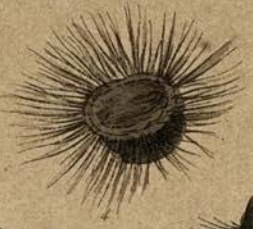

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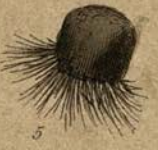

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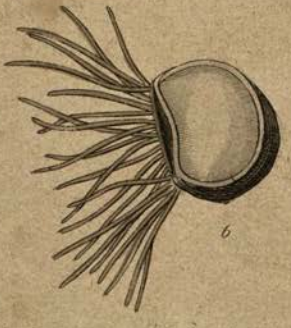

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LASIOBOTRYS LONICERÆ.

Woodbine Lasiobotrys.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *HYPOXYLÆ, De Cand. Grev.*

GENERIC CHARACTER.

Epiphyllus. Erumpens. Perithecia subglobosa, strato unico coarctata, basi fibroso-radiata; intus massâ granuloso-gelatinosa cum sporidiis subglobosis farcta.

Epiphyllous. Bursting forth. Perithecia subglobose, crowded, forming a single stratum, the base furnished with radiating fibres; within filled with a granuloso-gelatinous mass, mixed with subglobose sporidia.

SPECIFIC CHARACTER.

LASIOBOTRYS Loniceræ; *peritheciis lævibus confertissimis atris, fibris radicantibus simplicibus.*

L. perithecia even, very crowded, black, the radicating filaments simple.

LASIOBOTRYS Loniceræ, *Kunze, Mykol. Hefte*, 2. p. 88.—*Spreng. in Litt.*

XYLOMA Loniceræ, *Schleich. Stirp. Exsicc. fid. Kunze.—Fries, Obs. Mycol.* 1. p. 198. t. 4. f. 7.

XYLOMA Xylostei, *Chaillet, ined.—De Cand. Fl. Franç.* v. 2. p. 599. & v. 6. p. 154.—*Ejusd. Syn.* p. 63.—*Mem. du Mus.* 3. p. 319. t. 3. f. 2.

SPHÆRIA ruboidea, *Fries, in Vet. Ac. Handl.* 1817, p. 269. & *in Kunze, Myc, Heft.* 2. p. 35.

DOTHIDEA Loniceræ, *Fries, Syst.* v. 2. p. 557.

HAB. On the living leaves of various species of *Lonicera*. On *Lon. Periclymenum* in Darnway woods, Dr HOOKER and Dr GREVILLE. I have since found it occasionally in other places in Scotland.

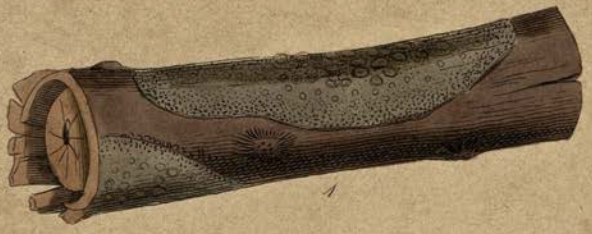
This plant originates beneath the epidermis of the leaf, during its green and living state. When mature, it is of a very black colour, and regular, circular form, from one to two lines in breadth, very slightly convex, the surface uniformly granulated, and the whole generally situated on a paler or colourless portion of the leaf. On the bursting or laceration of the epidermis of the leaf, which first takes place in the centre, our plant is found to consist of a multitude of distinct *perithecia*, of a roundish form, closely arranged side by side, destitute of orifice, and the summits of which produce a granulated appearance to the naked eye or a small magnifier. These *perithecia* are fixed to the leaf by a number of short filaments radiating from their base, and are not to be detached without some force. Their surface is smooth, black. Within

they are replete with a somewhat gelatinous granulose mass, containing subglobose sporidia. The above is a description of the usual appearance of this plant. A variety, however, occurs in the form of a ring or *annulus*, the centre being unoccupied. Sometimes the perithecia are scattered in irregular groups, of few together, and may even occur solitary.

My friend Professor KUNZE of Leipsic, has given an excellent history of this very singular plant in his instructive work "Mykologische Hefte." He has observed, what indeed must strike every one who dissects it, how greatly it resembles the genus *Erysiphe* (*Alphitomorpha*, WALLR.); and he adds, that it is intermediate, as it were, between that genus and *Sphœria*.

FRIES, in his excellent system, has placed it in his *Xyloma* division of *Dothidea*; but I must confess I do not find its structure to accord sufficiently with *Dothidea*, to admit it as a species. I have therefore retained the name appropriated to it by SPRENGEL, and published by KUNZE. In a short time I shall be able to contrast it with *Dothidea betulina* and *D. Ulmi*, which are somewhat similar in external character, but have no analytical resemblance. Nearly allied, however, to *Lasiobotrys Lonicerœ*, is a plant which I had the pleasure of lately receiving from Dr MOUGEOT, produced, I think, upon a leaf of *Rubus Idœus*. After a careful examination, I can scarcely find any specific difference, though such may still exist.

Fig. 1. *L. Lonicerœ, nat. size.* Fig. 2. *A plant before the epidermis has been ruptured, and a portion of another with the epidermis partly removed.* Fig. 3. *Perithecia.* Fig. 4. *A perithecium viewed from below.* Fig. 5. *The same in another point of view.* Fig. 6. *Section of a perithecium.* Fig. 7. *Sporidia.*—*All but* Fig. 1. *more or less magnified.*



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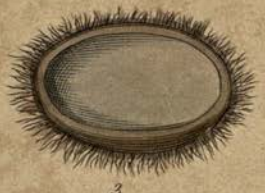

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PEZIZA FUSCA.

Brown Peziza.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *FUNGI, Link, Grev.*

SERIES II. LACHNEA—TRIBE VII. TAPESIA, *Fries.*

GENERIC CHARACTER.

Pileus stipitatus aut sessilis, plus minusve cupuliformis vel complanatus, tubulis elongatis sporuliferis in pagina superiore.

Pileus stipitate or sessile, dilated upwards into a cup-shaped or flattish receptacle, with tubular elongated sporuliferous cells in the upper surface or disk.

SPECIFIC CHARACTER.

PEZIZA fusca; *carnosa, sessilis, cupulis concavis, fuscis, demum applanatis, cinereis, margine glabris, subtus pilis subiculo lato tomentoso adfixis.*

P. carnose, sessile, cupula concave, brown, at length plane, grey, the margin glabrous, attached by fibres underneath to a widely spreading tomentose web.

PEZIZA fusca, *Pers. Obs.* 1. p. 29.—*Syn. Fung.* p. 657.—*Mycol. Europ.* 1. p. 272.—*Alb. et Schwein.* p. 328.—*De Cand. Fl. Franç.* v. 6. p. 18.—*Fries, Sclerom. Suec. Exsicc.* No. 292.—*Schwein. Fung. Carol.* No. 1217.

P. Pruni avium, *Pers. Obs.* 2. p. 82.—*Myc. Europ.* 1. p. 273.

HAB. On the dead branches of trees, lying on the ground in moist situations. On the branches of Alder Trees *(Alnus glutinosa)*, near Lasswade. April and May.

Subjacent web of a dark brown colour, spreading in an orbicular manner, and often two or three inches in breadth, presenting a surface between tomentose and granulated. The *cupulæ* (little cups) at their first appearance are half immersed, globose, minute, of the same colour as the web, their margin connivent and pale, by degrees they expand, become concave and brown, at length quite flat, grey, somewhat undulate, and of a soft consistence. The margin is always paler than the external surface of the cupule, and glabrous. Beneath, the cupulæ are fixed by numerous thickish, short filaments to the subjacent web or stratum. *Thecæ* slender. *Sporidia* minute, oval, few.

At a little distance, this species of *Peziza* has a striking resemblance to abortive plants of *Parmelia olivacea*, to which its regularly circular form greatly contributes. It occurs on the branches of various trees, as on species of *Alnus*, *Populus*, *Salix*, *Corylus*, *Prunus*, &c. In N. America, SCHWEINITZ finds it on species of *Sambucus*.

PERSOON's *P. Pruni-avium* is certainly nothing more than our plant in a young state; and it may be worth observing, that its complete development depends a good deal upon the weather. A dry season, and warm sun, often arrest it when half grown, and in that case the cupulæ rarely become perfected.

Fig. 1. *P. fusca, nat. size.* Fig. 2. *A portion magnified.* Fig. 3. *A cupule removed.* Fig. 4. *The same dissected.* Fig. 5. *A small vertical slice of the whole plant.—All magnified except* Fig. 1.

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DIDYMODON OBSCURUS.

Obscure Didymodon.

CLASS AND ORDER CRYPTOGAMIA MUSCI, *Linn.*—NAT. ORD. *MUSCI, Juss. &c.*

GENERIC CHARACTER.

Seta terminalis. Peristomium simplex e dentibus 16 *vel* 32, *per paria approximatis, vel ad basin unitis. Calyptra dimidiata.*—HOOK.

Seta terminal, peristome simple, of 16 or 32 teeth, approaching in pairs, or united at the base. Calyptra dimidiate.

SPECIFIC CHARACTER.

DIDYMODON obscurus; *caulibus dense cæspitosis, ramosis; foliis lanceolato-subulatis, apicem versus subserratis, siccitate tortuosis, nervo valido percurrente; theca sub-erecta ovata, operculo oblique rostrato.*

D. stems densely tufted; leaves lanceolate-subulate, somewhat serrated towards the point, tortuose when dry, the nerve strong, running to the apex; capsule nearly erect, ovate, the lid obliquely rostrate.

DIDYMODON obscurus, *Kaulf. in Sturm's Deutschl. Flora*, Fasc. 16. No. 9. cum icone.—*Schwaegr. Suppl.* 2. p. 80. t. 125.—*Funck, Deutschl. Moose*, t. 14.

DICRANUM polycarpum, *Hook. & Tayl. Musc. Brit.* p. 57. t. 18.—*Hook. Fl. Scot.* 2. p. 133.—*Hobs. Musc. Brit.* v. 2.—*Grev. Fl. Edin.* p. 240.

WEISSIA cirrata, *Moug. et Nestl. Stirp. Exsicc.* No. 406.

HAB. Rocks in subalpine districts. Pentland Hills.

Plants growing in dense round tufts 1–3 inches broad, and rather light green colour. *Stems* crowded, branched, half an inch to near two inches in length. *Leaves* very numerous, long, spreading, lanceolate and acuminated, at the apex subulate, somewhat recurved at the margin, when dry much crisped. They are furnished with a strong nerve reaching to the point, where a few irregular serratures are usually visible. Below, the colour of the leaves is yellowish or brownish, at the extremity bright green. *Reticulation* minute. *Fruitstalk* not half an inch in length, slender. *Capsule* ovate, even, very slightly inclined, green till quite mature, afterwards becoming brown. *Lid* about half the length of the capsule, pale red at the base, furnished with an obliquely subulate beak. *Peristome* composed of 32 teeth, placed in pairs, rather broad at their base, very slender upwards, transversely striated, and often almost moniliform, from contraction at the joints.

That *Dicranum polycarpum* of HEDWIG is a species even now not satisfactorily understood, is a fact which few bryologists I believe will be inclined to deny. Nor is it improbable that a portion of the uncertainty which seems to have attached to it, may have arisen from the subject of the present description having been from time to time confounded with it, especially in this country, where it has been thus taken up by the authors of the Muscologia Britannica. M. KAULFUSS, a successful investigator of Bryology, discovered the present moss near Cilley in Styria in 1812, as we learn from his own account in STURM's "Deutschlands Flora." He described it as a *Didymodon*, but does not appear to have seen a perfect peristome, for he both describes and figures the teeth as remarkably short, and of a lanceolate form. SCHWAEGRICHEN, who has also described and given a figure of it in the first part of his second Supplement, from specimens communicated by KAULFUSS, has not furnished any additional representation, since he borrows KAULFUSS's own figure of the teeth.

My excellent correspondent Dr MOUGEOT, who was kind enough to send me perfect specimens very recently, seems to have been the first to ascertain the true nature of the peristome, and observes to me in a letter, that the teeth are in reality very different from the figures published of them. In fact, they are long, and though broad at the base, soon become very slender, and generally more or less contracted at the joints formed by the transverse striæ. They are very fragile, and scarcely to be seen entire, without carefully removing various opercula.

In general habit, *D. obscurus* closely resembles *Weissia cirrata*, but often grows to a larger size than that moss.

Figs. 1, 1. *D. obscurus, nat. size.* Fig. 2. *Cauline leaves.* Fig. 3. *Summit of a cauline leaf.* Fig. 4. *Perichætial leaf.* Fig. 5. *Capsule with Calyptra.* Fig. 6. *Capsule, with the lid.* Fig. 7. *Part of the capsule, with the peristome.* Fig. 8. *Three pairs of teeth removed from the peristome.* Fig. 9. *Sporules, magnified.*

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SPORIDERMIUM ATRUM.

Black Sporidermium.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *BYSSOIDEÆ? Grev.*

GENERIC CHARACTER.

Fibræ (Sporidia??) simplices, erectæ, opacæ, clavatæ, annulatæ, confertæ, effusæ.

Filaments (Sporidia??) simple, erect, opaque, clavate, transversely divided, crowded, effused.

SPECIFIC CHARACTER.

SPORIDERMIUM atrum; *atrum, confertissimum, fibræ lineari-oblongæ, 4–5-septatæ.*

S. black, very crowded, filaments linear-oblong, 4–5 times divided.

SPORIDERMIUM atrum, *Link.—Nees, Syst.* p. 5. t. 1. f. 18.

HAB. Parasitic on species of *Thelephora*. Autumn. Appin, Captain CARMICHAEL. Woods in the vicinity of Edinburgh.

A plant of a very simple structure, composed entirely of linear-oblong or club-shaped semi-opaque bodies, closely arranged side by side, exactly of the same height, and transversely divided by three or four dissepiments. When viewed with the naked eye, it resembles an intensely black, thin crust, creeping over the surface of *Thelephoræ*. The specimens from Captain CARMICHAEL, as well as those found by myself, occurred on *Thelephora vulgaris*.

In that eminently useful work, the "System der Pilze und Schwämme" of my friend Dr NEES VON ESENBECK, I find that LINK is the authority for the present genus, but I know not in what work, unless it be in the 5th volume of the Berlin Magazine, a book which I unfortunately do not possess, and which is not to be found in the public libraries of this metropolis.

I am quite at a loss in what light to regard the bodies of which the entire plant is composed; whether as filaments forming a general thallus, or as sporidia.

It is rapid in its growth, and frequently spreads over the whole fungus on which it is produced. Captain CARMICHAEL correctly observes, that a "curious struggle for existence may be remarked between the two plants. The parasite first spreads over the *Thelephora*, rendering it thin and flaccid, while the latter throws out a new flake, which in its turn spreads over and probably destroys the parasite."

Fig. 1. *S. atrum, on Thelephora vulgaris, nat. size.* Fig. 2. *A portion magnified.* Fig. 3. *Filaments (Sporidia?) highly magnified.*

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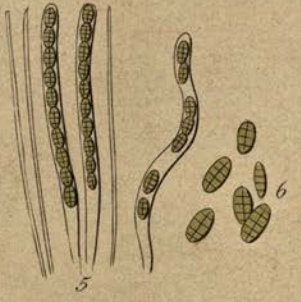
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CUCURBITARIA ELONGATA.

Long Black Cucurbitaria.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *HYPOXYLA, De Cand. Grev.*

GENERIC CHARACTER.

Sphærulæ corneæ, cæspitosæ, liberæ, receptaculo insidentes, raro primo inclusæ; intus massa gelatinosa sporulifera instructæ.

Spherules corneous, clustered, free, fixed on a receptacle, rarely at first included. Interior filled with a gelatinous sporuliferous mass.

SPECIFIC CHARACTER.

CUCURBITARIA elongata; *nigra; stromate longissimo; peritheciis primo immersis, dein erumpentibus, confertis, globosis, circa ostiolum papillæforme, annulato depressis.*

C. black; stroma very long; perithecia at first immersed, at length sessile, crowded, globose, orifice papilliform, with a circular depression around it.

SPHÆRIA elongata, *Fries, Obs.* 1. p. 175.—*Vet. Ac. Handl.* 1817, p. 109.—*Sclerom. Suec. Exsicc.* No. 233.—*Syst.* v. 2. p. 422.

SPHÆRIA scabra, *Schmidt, Myc. Heft.* 1. p. 58.—*Deutschl. Schwaem.* No. 203.

HAB. On branches of *Robinia Pseudacacia, Coronilla Emerus, Cytisus sessilifolius,* and *Ulex europæus.* Captain WAUCH and I find it on the latter. It is not unfrequent on the moors and waste places about Edinburgh.

Stroma half an inch or less to near two inches in length, rather narrow, variable in thickness. *Perithecia* numerous, globose, at first immersed, afterwards evolved and sessile, minutely granulated, sometimes smooth according to FRIES, orifice papilliform, and surrounded with a depression, which gives a flattish appearance to the top. *Thecæ* much elongated, linear, containing 8–10 sporidia. *Sporidia* oblong, yellow, compressed, marked with 3–4 transverse striæ, and 1 longitudinal one.

A variety occurs with few, somewhat scattered perithecia, and scarcely any stroma. This is the var. *simplex* of FRIES, of which he has given a specimen in *Sclerom. Suec.* No. 232.

This plant I have had in my collection for three or four years, and knew not to what to refer it, till FRIES, with great kindness, sent me his published collection, entitled "Sclero-myceti Sueciæ," a most useful work, and constantly quoted in his Systema.

The most remarkable circumstance in this species, is the great size and number of the sporidia in each theca. I have frequently seen ten, which exceeds that of every other species I am acquainted with.

Fig. 1. *C. elongata, var. simplex.* Fig. 2. *Usual and more perfect state of the same plant, natural size.* Fig. 3. *Stroma divided vertically, with the mature sessile perithecia.* Fig. 4. *A perithecium removed.* Fig. 5. *Thecæ and paraphyses.* Fig. 6. *Sporidia.—Magnified.*

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HYDNUM Auriscalpium.

Hairy-stalked Hydnum.

Class and Order CRYPTOGAMIA FUNGI, *Linn.*—Nat. Ord. *FUNGI, Link, Grev.*

GENERIC CHARACTER.

Hymenium aculeatum. Aculei vel processi subulati, liberi, carnosi, sporuliferi.

Hymenium spinose. Spines or awl-shaped processes free, carnose, sporuliferous.

SPECIFIC CHARACTER.

Hydnum Auriscalpium; *pileo horizontali, coriaceo, tomentoso, aculeisque subspadiceis; stipite erecto, laterali, tomentoso.*

H. pileus horizontal, coriaceous, tomentose, of a brownish colour, as well as the spines; stipes erect, lateral, tomentose.

Hydnum Auriscalpium, *Linn.—Schœff. Fung.* t. 143.—*Bull. Champ.* t. 481. f. 3.—*Curt. Fl. Lond.* (ed. 2. *cur. Hook. cum icon.*)—*With. Bot. Arr.* v. 4. p. 401.—*Huds. Fl. Angl.* p. 629.—*Lightf. Fl. Scot.* 2. p. 1042.—*Rose, Elements of Bot. App.* t. 3.—*Pers. Comment.* p. 56.—*Syn. Fung.* p. 557.—*De Cand. Fl. Franç.* v. 2. p. 110.—*Ejusd. Syn.* p. 22.—*Bolt. Fung.* t. 90.—*Sow. Fung.* t. 267.—*Alb. et Schw.* p. 267.—*Relh. Fl. Cantab.* ed. 3. p. 549.—*Fl. Dan.* t. 1020.—*Nees, Syst.* t. 32. f. 243.—*Winch, Bot. Guide,* 2. p. 97.—*Purt. Midl. Fl.* v. 2. p. 676.—*Fries, Obs.* 1. p. 146.—*Syst.* v. 2. p. 406.—*Hook. Fl. Scot.* 2. p. 28.—*Grev. Fl. Edin.* p. 406.

Erinaceus parvus hirsutus, *Mich.* t. 72. f. 8.

Hab. On the cones of *Pinus sylvestris* (and other species?) frequent. Woods about Edinburgh, throughout the whole year.

Pileus roundish, about three-fourths of an inch in breadth, nearly plane, or somewhat convex, entire at the margin, of a leathery substance; *surface* tomentose, obscurely zoned; *colour* purplish-brown. *Spines* of the *hymenium* generally paler than the pileus, darkest at their apex, which is entire. *Stipes* often branched at the base, 2–4 inches long, erect, lateral, cylindrical, tomentose, brown, terminating in a shaggy root, which is always fixed to the cone of some species of Fir. *Thecæ* linear. *Sporidia* globose.

Hydnum Auriscalpium is one of the species of the most frequent occurrence, though requiring the eye of a person accustomed to such plants, in order to discover it; for it rises but little above the surface of the ground, and, from its brown colour, is easily passed over. From its general colour, its tomentose surface, leathery substance, and erect lateral stipes, it is so well marked, that scarcely any plant of the Order can be mentioned, which has passed down from the old to the present time so entirely free from confusion and uncertainty. Happy would it be for the modern botanist could he escape from the toilsome and ungracious task of detecting the faults and reconciling the nomenclature of a synonymy often replete, not only with simple error, but with barbarous ignorance, and arbitrary innovation.

Fig. 1. *A group of H. Auriscalpium, of different ages.* Fig. 2. *A mature plant removed.* Fig. 3. *A lateral view of the pileus, natural size.* Fig. 4. *A section of the pileus, and part of the stipes.* Fig. 5. *One of the spines of the hymenium.* Fig. 6. *A slice taken transversely from the same.* Fig. 7. *Thecæ and sporidia, magnified.*

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CENANGIUM FERRUGINOSUM.

Ferruginous Cenangium.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *FUNGI? Grev.*

GENERIC CHARACTER.

Receptaculum clausum, demum plus minus apertum, inferne centro adfixum. Hymenium læve, discolor; thecis fixis.

Receptacle closed, at length more or less open, attached by the centre beneath. Hymenium smooth, of a different colour; thecæ fixed.

SPECIFIC CHARACTER.

CENANGIUM ferruginosum; *" gregaria, coriaceo-membranaceum, subsessile, rugosum, subpruinosum, cervino-nigrescens, ore compresso, inflexo, humido patulo, disco lutescente."*—FRIES.

C. gregarious, between membranaceous and leathery, subsessile, rugose, somewhat pruinose, reddish-black, the orifice compressed, inflexed, when moist spreading, the disk yellow.

CENANGIUM ferruginosum, *Fries, in Vet. Ac. Handl.* 1818, p. 361.—*Sclerom. Suec.* No. 292.—*Syst.* 2. p. 187.

TRIBLIDEUM pineum, *Pers. Myc. Europ.* 1. p. 332.

PEZIZA Abietis, *Pers. Syn.* p. 671.—*De Cand. Fl. Franç.* v. 6. p. 20.—*Moug. et Nestl. Exsicc.* No. 399.—*Alb. et Schw.* p. 342.—*Schwein. Fung. Carol.* No. 1250.

PEZIZA cervina, *Pers. Syn.* p. 647.

HAB. On the smaller branches of the Scots Fir *(Pinus sylvestris)*, in autumn, very frequent.

Plant at first resembling a *Sphæria* (as FRIES has well remarked.) The *cupulæ* are coriaceous, roundish, or slightly angular, nearly sessile, or somewhat stipitate, closed, at length open, and becoming more or less expanded, 1–2 lines broad, the *hymenium* of a pale greenish-yellow, blackish without, and more or less sprinkled with a reddish pulverulent substance. *Thecæ* intermixed with *paraphyses*, elongated, filiform, fixed, containing numerous sporidia of an oval form.

Cenangium is a genus instituted by M. FRIES, and contains 30 species, either new, or derived from the genera *Peziza*, *Sphæria*, and *Hysteria* of other authors. His character, as

detailed at length, is, " Receptaculum arcte clausum, demum plus minus apertum, marginatum, epidermide crassa discolori. Hymenium læve persistens. Asci fixi, plus minus evoluti, paraphysibus immixtis; sæpe connati, sporidiis secedentibus. Cupula centro adfixa, sæpe stipitata, innato-erumpens, liberata, disco discolori. Substantia duplex, exterior coriacea vel membranacea, interior subgrumosa. *Forma varia.*

The species he has divided into four Tribes:

I. SCLERODERRIS. Erumpentes, substipitatæ, primo sphæriæformes, dein ore orbiculari, integro, apertæ. *Majores.* Species 1–10.

II. TRIBLIDIUM. Pezizoidea, demum rimis a centro hiantibus aperta. Species 11–17.

III. CLITHRIS. Hysteriiformes, rima longitudinali dehiscentes. Species 18–24.

IV. EXCIPULA. Innato-sessiles, subcorneæ, vasculiformes, disco minuto molli subdeliquescente. Species 25–30.

From *Peziza*, M. FRIES observes it differs principally in the coriaceous cupulæ, which are composed besides, of two substances; and from *Tympanis*, in the open cupulæ, and firm hymenium, which becomes cleft and cracked in age.

Cenangium ferruginosum is so abundant as often to cover the greater part of the branches of a fallen fir tree. I have received it from Mr DRUMMOND of Forfar, Sir WILLIAM JARDINE, Bart. and other friends.

Fig. 1. *C. ferruginosum, natural size.* Fig. 2. *A group of plants in a moist state.* Fig. 3. *The same in a dry state.* Fig. 4. *A cupule divided.* Fig. 5. *A portion of the hymenium, with thecæ and sporidia, magnified.*

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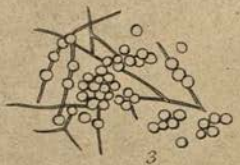

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SEPEDONIUM MYCOPHILUM.

Yellow Sepedonium.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *BYSSOIDEÆ, Grev.*—MUCEDINES, *Link.*

GENERIC CHARACTER.

Thallus e floccis contextis (fungis putrescentibus) innatus. Sporidia inspersa, globosa.

Thallus composed of entangled filaments produced within putrefying fungi. Sporidia scattered, globose.

SPECIFIC CHARACTER.

SEPEDONIUM mycophilum; *citrinum, fungos putrescentes penetrans; sporidiis copiosissimis.*

S. bright orange, occupying the interior of dying fungi. Sporidia exceedingly copious.

SEPEDONIUM mycophilum, *Link, in Berl. Mag. 3.* p. 18.—*Nees, Syst.* p. 11. t. 3. f. 38.—*Schm. et Kunze, Deutschl. Schwaem.* No. 223.—*Grev. Fl. Edin.* p. 466.—*Brongniart, in Dict. des Sciences Nat.* v. 3. p. 539.

UREDO mycophila, *Pers. Obs. Myc.* 1. p. 16.—*Syn. Fung.* p. 214.—*Alb. et Schwein.* p. 122.—*De Cand. Fl. Franç.* v. 2. p. 230.—*Ejusd. Syn.* p. 48.

RETICULARIA chrysosperma, *Bull. Champ.* t. 476. f. 4.

MUCOR chrysospermus, *Bull. Champ.* p. 99. t. 504. f. 1.—*Sow. Fung.* t. 378. —f. 13.—*With. Bot. Arr.* v. 4. p. 479.—*Relh. Fl. Cantab.* ed. 3. p. 579.—*Winch, Bot. Guide,* 2. p. 110.—*Purt. Midl. Fl.* v. 2. p. 722.

HAB. On dying, putrescent fungi, chiefly Boleti; frequent in autumn.

Plant appearing at first in the form of a minute white cottony down, gradually covering the whole fungus; and when the latter is broken, it is found to be filled with a mass of bright yellow sporidia, interspersed with a few white filaments; this seems to be the general appearance of *Sepedonium mycophilum* in a mature state. The *filaments* are branched and very slender. The *sporidia* globular, minute, excessively numerous, and probably attached to the filaments at one period of their growth.

To PERSOON and others who have described this *Byssoidea* as a *Uredo*, the thallus (or filaments) was unknown; and

occurring, as the plant does, in the very heart, and throughout the whole substance of the fungus in which it is produced, it is no easy matter to discover the filaments, which are very fine, and few in number. They unquestionably, however, exist, and LINK has therefore made it the type of a new genus, under the name of *Sepedonium*. It is of extremely frequent occurrence, and is best marked at a distance by the white cottony appearance of the exterior of the fungus.

Fig. 1. *A Boletus infested with Sepedonium mycophilum.* Fig. 2. *Section of a portion of the same, natural size.* Fig. 3. *Sporidia and filaments magnified.*

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GRIMMIA TORQUATA.

Twisted Grimmia.

CLASS AND ORDER CRYPTOGAMIA MUSCI, *Linn.*—NAT. ORD. *MUSCI, Juss. &c.*

GENERIC CHARACTER.

Seta terminalis. Peristomium simplex e dentibus 16 *integris vel perforatis (rarissime fissis) æquidistantibus. Calyptra mitriformis.*—HOOK.

Fruitstalk terminal. Peristome simple, of 16 entire or perforate (rarely cleft) equidistant teeth. Calyptra mitriform.

SPECIFIC CHARACTER.

GRIMMIA torquata; *caulibus elongatis, pulvinatis, foliis lanceolatis acuminatis, superioribus piliferis, carinatis, siccitate insigniter spiraliter tortis.*

G. stems elongated, pulvinate, leaves lanceolate, acuminate, carinate, the uppermost ones piliferous, when dry remarkably twisted in a spiral manner.

GRIMMIA torquata, *Hornsch.* MSS.—*Hook. & Tayl. Musc. Brit.* ed. 2. MSS. *Drummond, Musc. Scot.* v. 2. No. 28.

HAB. On rocks among the mountains, at a considerable elevation. Very abundant in Breadalbane, on Ben Lawers, Craig Chailleoch, Mealgreadha, &c. Dr HOOKER, Mr ARNOTT, Dr GREVILLE. Clova Mountains, Mr DRUMMOND.

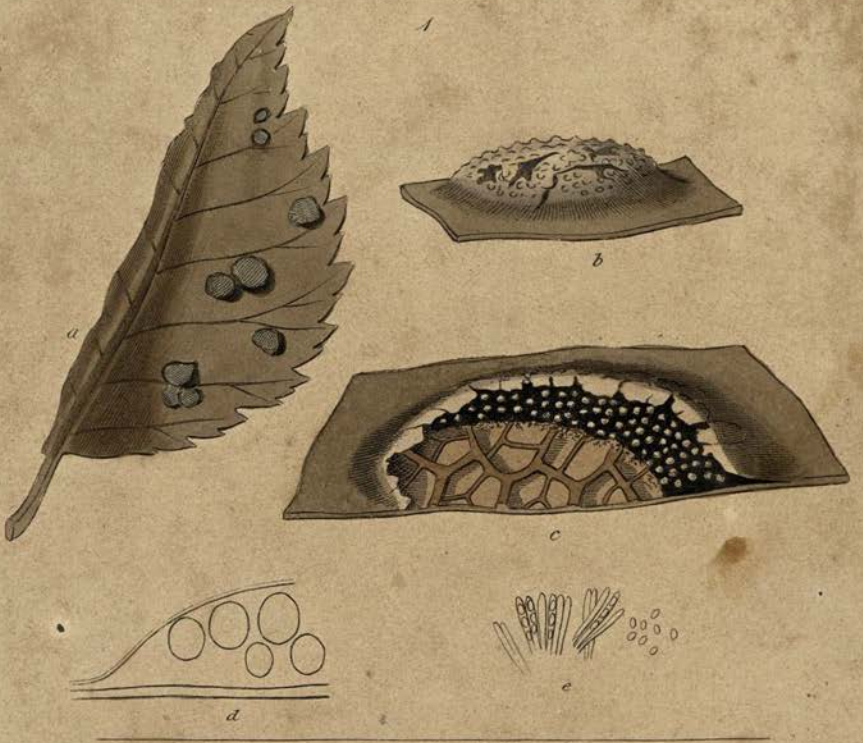
Plant forming large rounded masses, 8–12 inches broad. *Stems* equal, 1–3 inches long, bearing a few long erect branches in a fasciculated manner, the summits of which are mostly on the same level. *Leaves* numerous, suberect, lanceolate, acuminate, carinate, the margins somewhat reflexed, the nerve running to the point or beyond it, in the uppermost ones piliferous, and pellucid at the point. When moist, the leaves are twisted closely round the stems in a conspicuously spiral manner. *Colour* greenish at the summit, but dark reddish or purplish-brown below. *Reticulation* small, but the cellules not very densely arranged. *Fructification* unknown.

Among the recent acquisitions of new mosses to the flora of Scotland, are two new species of *Grimmia*, both of which have been published in DRUMMOND's "Musci Scotici," on the authority of the manuscript of the second edition of the "Mus-

cologia Britannica." One of these species is now presented to the public; the other will be inserted in the ensuing number of this work.

Grimmia torquata, which I had the pleasure of receiving two years ago from my friend M. FREUCHEN, as a MS. species of M. HORNSCHUCH, has never, I believe, been found in fruit. It is therefore only from the habit and structure of the plant that it has been placed in the genus *Grimmia*. On the rocks of our own mountains, it preserves its barren character, but is so conspicuous from its large masses, and its stems so remarkably spiral, from the twisting of the leaves, that there is no chance of any other moss whatever being confounded with it. Another peculiarity attending it is, that, though growing in a remarkably compact manner, its stems, when gathered, separate of their own accord, as if they had no other connection than that of mere juxtaposition. In the Breadalbane district, there are few mosses more plentiful; and, as may be supposed, it has been in the herbaria of Dr HOOKER and myself for some years. We have never, however, succeeded in finding the least vestige of fructification, though for several seasons we have made a diligent search. Dr HORNSCHUCH's specimens were gathered on the Carinthian Alps.

Fig. 1. *Plants, natural size.* Fig. 2. *A portion of a branch in the moist state.* Fig. 3. *A portion in a dry state.* Fig. 4. *A lower leaf.* Fig. 5. *An upper leaf.* Fig. 6. *Summit of an upper leaf.* Fig. 7. *Portion of a leaf to shew the reticulation,—more or less magnified.*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DOTHIDEA ULMI.

Elm-leaf Dothidea.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *HYPOXYLA*, *De Cand. Grev.*

GENERIC CHARACTER.

"*Cellulæ (plures vel solitariæ) in stromate immersæ, subrotundæ, nucleo cereo farctæ, demum ore simplici apertæ, absque proprio perithecio.*

Cellules (several or solitary) immersed in a receptacle, somewhat round, filled with a wax-like nucleus, at length opening by a simple orifice, without a real perithecium.

SPECIFIC CHARACTER.

DOTHIDEA Ulmi; "*epiphylla, subrotunda, confluens, convexa, cinereo-nigra, intus nigra, cellulis albis, ostiolis granulæformibus.*"—FRIES.

D. epiphyllous, roundish, confluent, convex, greyish-black, black within, the cellules white, orifices granuliform.

DOTHIDEA Ulmi, *Fries, Syst.* v. 2. p. 555.
SPHÆRIA xylomoides, *De Cand. Fl. Franç.* v. 2. p. 288.—*Ejusd. Syn.* p. 60.
SPHÆRIA Ulmi, *Duval, in Hopp. Bot. Tasch.* 1809, p. 105.—*Fries, in Vet. Ac. Handl.* 1816, p. 143.—*Holl et Schmidt, Deutschl. Schwaem.* No. 32.
SPHÆRIA Ulmaria, *Sow. Fung.* t. 374. f. 3.
STROMATOSPHÆRIA Ulmaria, *Grev. Fl. Edin.* p. 359.
XYLOMA Ulmeum, *Mart. Cr. Erlang. fide Fries.*
XYLOMA Ulmi, *Purt. Midl. Fl.* v. 3. p. 317.

HAB. On the dead leaves of various species of Elm (*Ulmus*); very frequent in autumn and winter.

Receptacles from almost a point to nearly a quarter of an inch broad, roundish, confluent, convex, of an iron-grey colour, originating beneath the epidermis, which becomes cracked and torn, but is more or less persistent. Within, they are black, and almost filled with *cellules*, of a subglobose form, those towards the surface becoming furnished with small orifices, which resemble warts on the surface of the receptacle, as represented at Fig. b. The *cellules* are white internally, and contain thecæ of an elongated, linear, obtuse figure, inclosing oval sporidia.

The receptacles of this plant, as well as of the following one, contain real cellules, or, in other words, the *thecæ* and *sporidia* are situated in regular-shaped cavities, which are destroyed when the receptacle is broken up, and are not left entire; as is the case with the compound *Sphæriæ*. In this respect, independently of other equally important circumstances, both of these plants differ from Dothidea *Loniceræ* (Lasiobotrys *Loniceræ* of KUNZE, figured at t. 191. of this work.)

Fig. 1. a, *A portion of an Elm-leaf, with D. Ulmi, natural size.* b, *A single plant or receptacle.* c, *A portion of an old receptacle represented, part of it having fallen away.* d, *A section of a part of a receptacle in a rather young state, shewing the simple cellules.* e, *Thecæ and sporidia, magnified.*

DOTHIDEA BETULINA.

Birch-leaf Dothidea.

SPECIFIC CHARACTER.

DOTHIDEA betulina; "*epiphylla angulato-difformis, subconfluens, tuberculosa, atro-nitens, intus nigra, cellulis albis.*"—FRIES.

D. epiphyllous, somewhat angular and irregular in form, subconfluent, tuberculose, black, shining, black within, the cellules white.

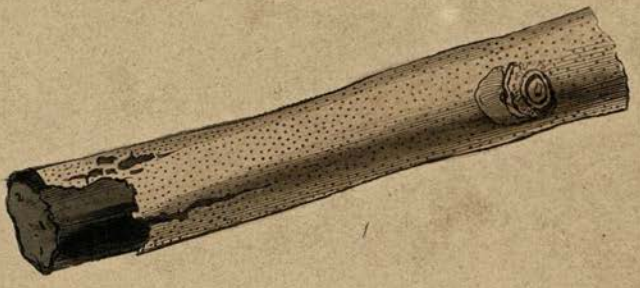
DOTHIDEA betulina, *Fries, Syst.* v. 2. p. 554.
XYLOMA betulinum, *Fries, Obs. Mycol.* 1. p. 198.—*De Cand. Mem. Mus.* III. p. 319. t. 3. f. 1.—*Funck, Exsicc.* No. 382.—*Moug. et Nestl. Stirp. Exsicc.* No. 370.
XYLOMA populinum, *Schum. Sælland,* 2. p. 179. *fide Fries.*
SPHÆRIA xylomoides, *Fries, in Ac. Vet. Handl.* 1816, p. 143.—*Sclerom. Suec.* No. 144.
SPHÆRIA atro-nitens, *Holl, et Schmidt, Deutschl. Schwaem.* No. 29.
SPHÆRIA Betulæ nanæ, *Wahl. Fl. Lapp.* p. 143. t. 30. f. 3.

HAB. On the living and dead leaves of the Common Birch *(Betula alba)*, in summer and autumn, not unfrequent. Common in the Highlands of Scotland, where birch trees are plentiful. On the dwarf Birch *(B. nana)*, more rare, Mr WALKER ARNOTT.

Receptacles very numerous, scattered, or a good deal crowded, minute, very irregular in form, and several often running into each other, very black, smooth, and shining; the surface rendered uneven and tuberculated by the inclosed cellules, which are large for the size of the plant. *Cellules* round, white within, containing linear-clavate *thecæ*, which inclose a few globose *sporidia*.

This plant, as well as the preceding, is a true *Dothidea*, answering extremely well to the generic character of M. FRIES. It belongs to the *Xyloma* division of the genus, in which my friend above named has included the *Sphæria typhina* of authors, a situation, I fear, it can scarcely expect to hold, having real perithecia.

Fig. 2. a, *A leaf of Betula alba, with D. betulina, natural size.* b, *Receptacles.* c, *A receptacle transversely divided.* d, *Thecæ and sporidia,—magnified.*



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CRYPTOSPHÆRIA MILLEPUNCTATA.

Many-dotted Cryptosphæria.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *HYPOXYLA*, *De Cand. Grev.*

GENERIC CHARACTER.

Receptaculum 0. *Sphærulæ duriusculæ, sparsæ vel aggregatæ, sub epidermide insidentes, ore nunc depresso nunc elongato, quandoque nullo; intus massa gelatinosa sporulifera instructæ.*

Receptacle 0. Spherules mostly corneous, scattered or aggregate, lying beneath the epidermis, with the mouth depressed, elongated or wanting, containing a gelatinous sporuliferous mass.

SPECIFIC CHARACTER.

CRYPTOSPHÆRIA millepunctata; *perithecia numerosa sub epidermide immersa, subregulariter sparsa, globosa, nigra, ostiolo perbrevi, obtuso, vix exserto; thecæ apice acutæ, sporidiis linearibus, curvatis.*

C. perithecia numerous, immersed beneath the epidermis, subregularly scattered, globose, black, the orifice very short, obtuse, scarcely exserted; thecæ acute at the apex, the sporidia linear, curved.

CRYPTOSPHÆRIA millepunctata, *Grev. Fl. Edin.* p. 360.

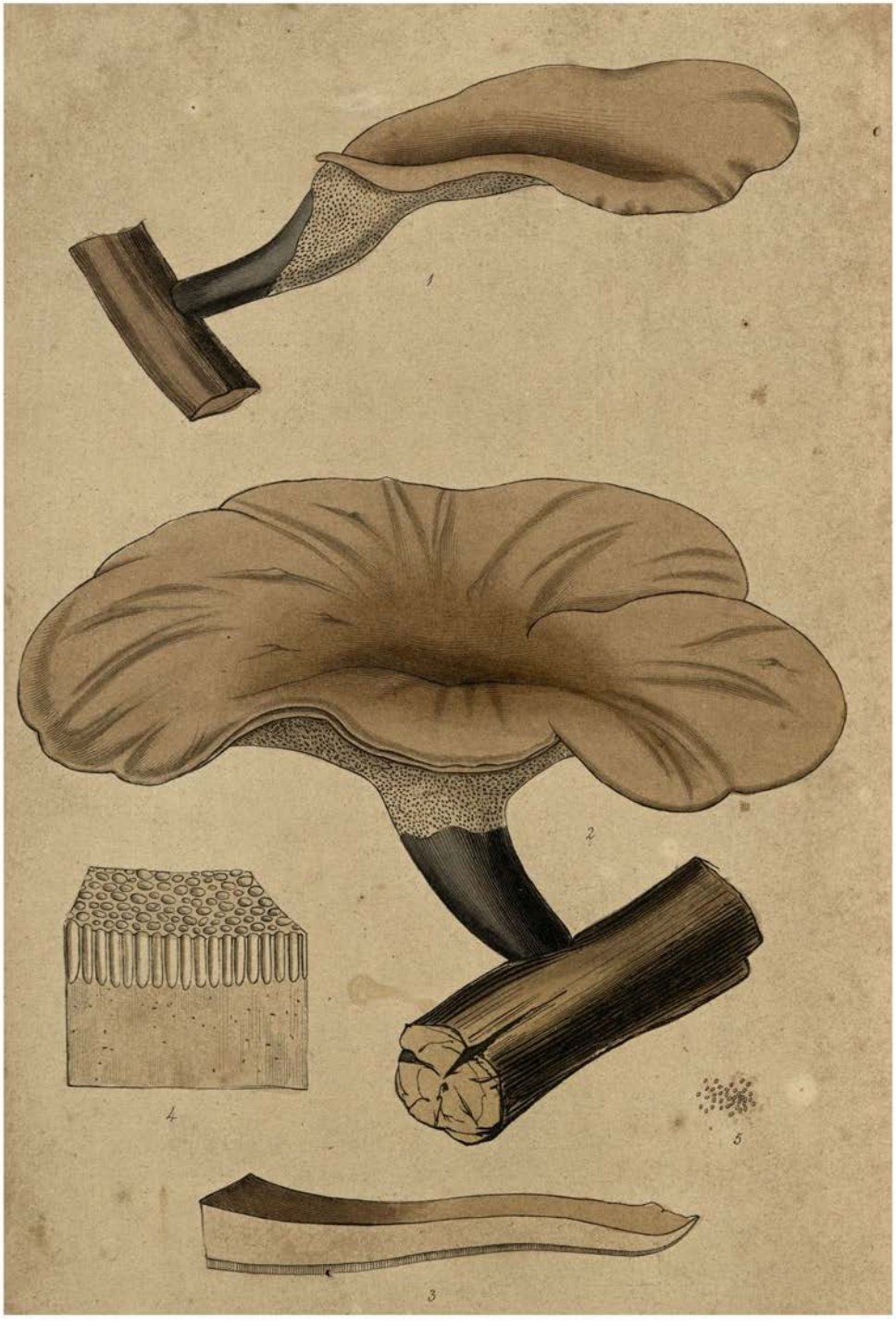
HAB. On the decaying small branches of the common Ash (*Fraxinus excelsior*), the whole year, frequent.

The branches of the Ash tree producing this species, seem to the naked eye to be covered with innumerable minute black dots. Under the microscope, these are found to be the orifices of perithecia concealed beneath the epidermis. The *perithecia* are of a globose form, black, corneous, white within; and their very short obtuse orifices are scarcely pushed beyond the level of the epidermis. *Thecæ* elongated, attenuated at both extremities, containing 3–4 linear, curved, simple, obtuse *sporidia*.

It is so difficult to determine the plants of this tribe, without figures to consult, that it is possible the present individual may be described in the Systema of M. FRIES. A diligent search, however, without success, induces me to continue it as a distinct species, not elsewhere noticed, except in my Flora

Edinensis. I have never seen it except upon the Ash; but in this country, it is of very frequent occurrence. Dr MOUGEOT has also discovered it in Germany, from whence he had the kindness to send me specimens. Dr MOUGEOT likewise informs me, that M. CHAILLET, a well known indefatigable observer of these plants, has communicated it to him from Switzerland.

Fig. 1. *Crypt. millepunctata,* natural size. Fig. 2. *A small portion of the branch, with plants.* Fig. 3. *A perithecium.* Fig. 4. *Thecæ and paraphyses.* Fig. 5. *Sporidia,* magnified.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POLYPORUS VARIUS
Variable Polyporus.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *FUNGI, Link, Grev.*

GENERIC CHARACTER.

Hymenium cum pilei substantia homogeneum et concretum, poris dissepimentis tenuibus simplicibus instructum.—Pileus subcarnosus vel suberosus, plerumque subsessilis, substantia fibrosa, sicca.

Hymenium of the same substance as the pileus, not separating from it, and furnished with pores connected by simple dissepiments.—Pileus subcarnose or corky, mostly subsessile; substance fibrous and dry.

SPECIFIC CHARACTER.

POLYPORUS varius; *pileo coriaceo, glabro, lævi, siccitate rigido, poris minutis, subrotundis, pallidis; stipite brevi, centrali vel laterali, lævi, pallido, deorsum frequentissime abrupte nigro.*

P. pileus coriaceous, glabrous, smooth, when dry rigid, the pores minute, roundish, pale; stipes short, central or lateral, smooth, pale, almost always abruptly black at the base.

POLYPORUS varius, *Fries, Syst.* v. 1. p. 352.—*Grev. Fl. Edin.* p. 399.

BOLETUS varius, *Pers. Obs. Myc.* 1. p. 85.—*Syn. Fung.* p. 523.—*Alb. et Schw.* p. 246.—*Schwein. Fung. Carol.* No. 884.

BOLETUS badius, *Pers. Syn.* p. 523.—*Schwein. Fung. Carol.* No. 883.

BOLETUS durus, *Timm. Fl. Megap.* p. 271.

BOLETUS variegatus, *Sow. Fung.* t. 368.—*Winch, Bot. Guide,* 2. p. 97.

BOLETUS lateralis, *Bolt. Fung.* t. 83.—*With. Bot. Arr.* v. 4. p. 390.—*Fl. Dan.* t. 1075. f. 1.—*Winch, Bot. Guide,* 2. p. 95.—*Hook. Fl. Scot.* 2. p. 27.

BOLETUS nigripes, *With. Bot. Arr.* v. 4. p. 438.

BOLETUS nummularius, *Bull. Champ.* t. 335. f. 124.—*Dicks. Crypt.* 1. p. 18. *Pers. Syn.* p. 519.—*With. Bot. Arr.* v. 4. p. 381.—*De Cand. Fl. Franç.* ed. 3. v. 2. p. 122.—*Ejusd. Syn.* p. 25.—*Relh. Fl. Cantab.* p. 545.—*Sow. Fung.* t. 86. smaller figures.—*Alb. et Schw.* p. 243.—*Purt. Midl. Fl.* v. 2. p. 662.—*Winch, Bot. Guide,* 2. p. 94.—*Nees, Syst.* t. 27. f. 214.—*Schwein. Fung. Carol.* No. 877.

BOLETUS aurantius, *Schœff. Fung.* t. 110.

BOLETUS elegans, *Bull. Champ.* t. 46.?

BOLETUS perennis, *Batsch. Cont.* 1. f. 129.

BOLETUS calceolus, *Bull. Champ.* p. 338. t. 360. et 445. f. 2.—*De Cand. Fl. Franç.* v. 2. p. 120.—*Ejusd. Syn.* p. 24.—*With. Bot. Arr.* 4. p. 389.—*Bolt. Fung.* t. 168.—*Purt. Midl. Fl.* v. 2. p. 666.

HAB. Trunks of trees, or on branches lying on the ground. Throughout the year, frequent.

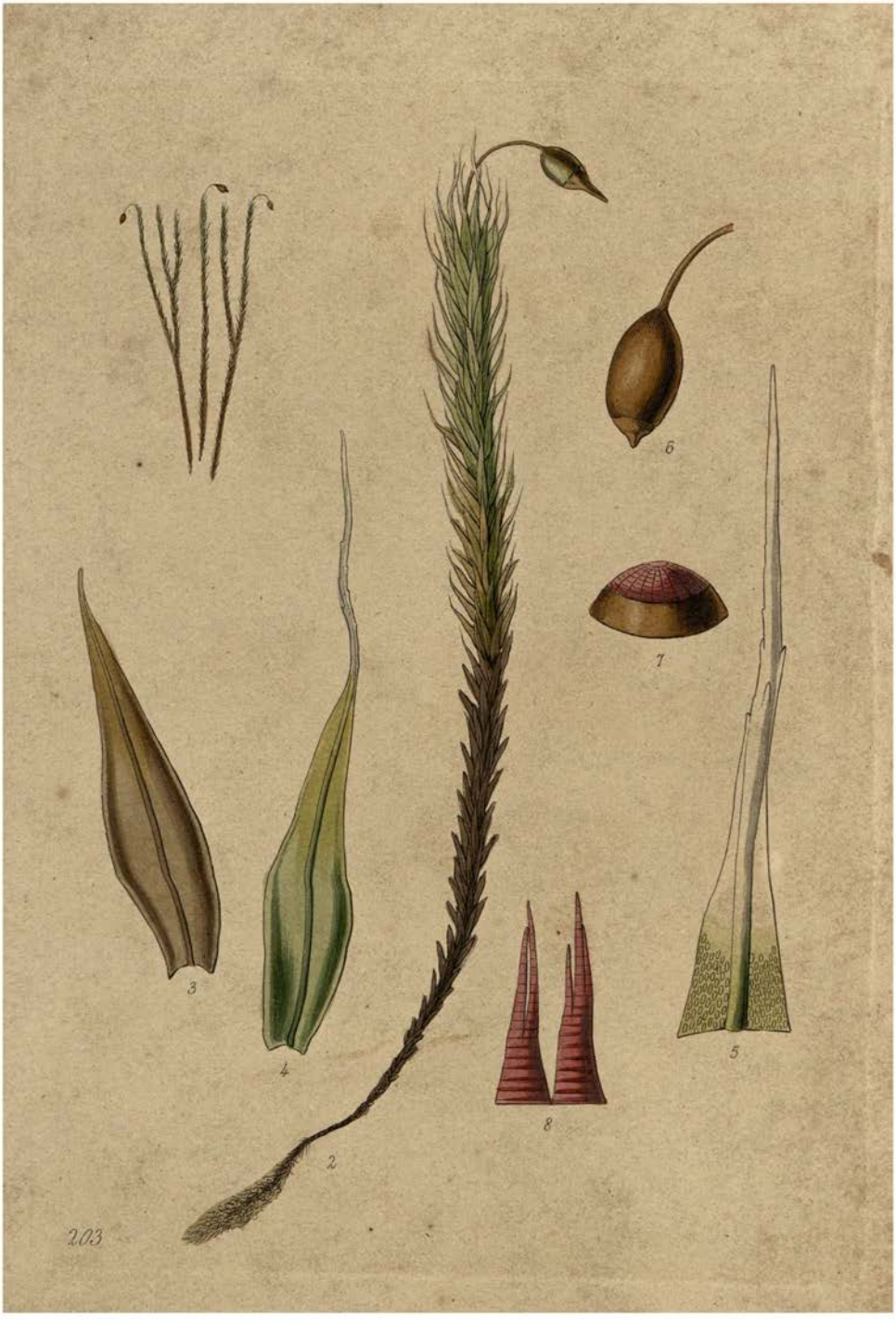
Plant solitary or tufted, exceedingly variable in size, form and colour. *Pileus* 1–5 inches broad, smooth, plane or somewhat concave in the centre, entire at the margin, or more or less lobed, never torn; *colour* varying from white to yellow, brown, reddish, or greyish. *Flesh* thin, white. *Pores* mostly white, rarely reddish, one-tenth of an inch in length, very minute, roundish. *Stipes* cylindrical, short, (rarely wanting), central, excentrical, or even lateral and horizontal, simple, or several confluent together, so as to appear branched, $\frac{1}{8}$ of an inch to near an inch in diameter, smooth, pale, black at the base; sometimes nearly the whole is black. *Sporidia* white, oval, minute. *Substance* of the whole plant firm, soft in the fresh state, but, when dry and old, perfectly hard.

In bringing the above variety of synonymes together, I have done little more than follow the labours of my excellent friend M. FRIES; not, however, of course, without a careful examination of the numerous authorities he has quoted. The additional ones are chiefly derived from British works, in which I have had the assistance of the Midland Flora of Mr PURTON; though I cannot admit *Boletus polyporus* of BULLIARD, and *Boletus betulinus* of BOLTON and WITHERING, brought forward as synonyms by that gentleman, to be connected with our plant, Proteus as it is.

The most remarkable characteristics of *Polyporus varius*, are the white flesh, and very short and very minute pores, conjoined with the extreme hardness of the whole plant in old age and the dry state. Though the base of the stipes in most instances becomes suddenly black, yet this is not an invariable character, as I have seen the whole stipes white, and at other times black up to the pores.

The small variety named by authors *nummularius*, is rarely larger than a shilling, and often appears to grow from the ground; but it will always be found attached to small branches rotting beneath the surface.

Fig. 1. *A specimen with a lateral horizontal stipes, being that variety which has been called Boletus Calceolus by authors.* Fig. 2. *Another variety, being the full size to which the plant attains.* Fig. 3. *A portion of the pileus;* natural size. Fig. 4. *A portion of the pileus, with pores.* Fig. 5. *Sporidia;* magnified.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GRIMMIA SPIRALIS.

Spiral piliferous Grimmia.

CLASS AND ORDER CRYPTOGAMIA MUSCI, *Linn.*—NAT. ORD. *MUSCI, Juss. &c.*

GENERIC CHARACTER.

Seta terminalis. Peristomium simplex e dentibus 16 integris vel perforatis (rarissime fissis), æquidistantibus. Calyptra mitriformis.—HOOK.

Fruitstalk terminal. Peristome simple, of 16 entire or perforate (rarely cleft) equidistant teeth. Calyptra mitriform.

SPECIFIC CHARACTER.

GRIMMIA spiralis; "*caulibus elongatis pulvinatis, foliis subtrifariis lanceolatis in acumen longum diaphanum piliforme productis, carinatis, siccitate tortis, capsula ovata lævi, seta curvata.*"—HOOK.

G. stems elongated, pulvinate, leaves subtrifarious, lanceolate, lengthened out into a long hair-like diaphanous point, twisted when dry; capsule ovate, smooth; fruitstalk curved.

GRIMMIA spiralis, *Hook. & Tayl. Musc. Brit.* ed. 2. MSS.—*Drummond, Musc. Scot.* v. 2. No. 29.

HAB. On rocks in the Scottish Highlands, at a considerable elevation. Throughout the whole of the Breadalbane range of mountains; in fruit upon Craig Challeach, Dr HOOKER, Mr WALKER ARNOTT, and Dr GREVILLE. Mountains of Clova, Mr DRUMMOND.

Plant growing in rounded masses two or three inches in breadth, and conspicuous from its hoariness. *Stems* 1–2 inches long, slender, slightly branched. *Leaves* subtrifarious, suberect, lanceolate, acuminate, carinate, margin slightly reflexed, the nerve running beyond the gradually lengthened point, and forming a hair-like diaphanous extremity. The leaves in the dry * state are twisted round the stem in a spiral manner, as in *G. torquata*, but not in so great a degree. *Colour* dark or yellowish-green at the summit, dark greenish-brown below. *Fruitstalk* very short, scarcely rising above the points of the leaves, curved. *Capsule* pale yellow-brown, ovate, smooth, the *lid* convex, with a very short, obtuse beak. *Teeth* of the *peristome* red, lanceolate, irregularly cleft into two or even three segments.

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* In the description of *Grimmia torquata*, t. 199. the reader is requested to substitute the term *dry* in the place of *moist* (the 9th line from the bottom of the page).

This new species of *Grimmia*, alluded to in the preceding Number, is generally found along with *Grimmia torquata*, but is easily distinguished from it by the hoariness of its aspect, when growing, and by the more slender stems, and less twisted, hair-pointed leaves when in the hand.

In general habit, it resembles some varieties of *Grimmia trichophylla* of this work (t. 100.); but the smooth capsule, and short fruit-stalk, will prevent it from being at any time confounded with it. There is only one other species with which I am acquainted, that may be compared with it, the *G. apiculata* of HOPPE and HORNSCHUCH. This has a short, curved seta, an ovate smooth capsule, and piliferous leaves. In habit, however, it is very different, being a more robust, and much shorter plant; and, when carefully examined, the operculum is found to be nearly plane, with a rounded conical beak set as it were upon it, instead of being convex, and shortly rostrate as in our plant. The leaves also of *G. apiculata* are much less piliferous than those of *G. spiralis*; the hairs are indeed scarcely perceptible to the naked eye, and only occur on the uppermost leaves. The teeth of the peristome afford a still more satisfactory character, since they are perforated, and not cleft.

Fig. 1. *Plants of Grimmia spiralis*, natural size. Fig. 2. *A plant, with capsule and calyptra.* Fig. 3. *A lower leaf.* Fig. 4. *An upper leaf.* Fig. 5. *Summit of a leaf.* Fig. 6. *Capsule, with the operculum.* Fig. 7. *Summit of the capsule, with the lid removed.* Fig. 8. *Two of the teeth of the peristome;* —magnified.

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STROMATOSPHÆRIA TYPHINA.

Grass-culm Stromatosphæria.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *HYPOXYLA, De Cand. Grev.*

GENERIC CHARACTER.

Receptaculum varium, sessile, liberum vel erumpens. Perithecia omnino latentia vel ore exserto; intus massa gelatinosa sporidifera instructa.

Receptacle various, sessile, free or bursting through the bark. Perithecia concealed, or furnished with a prominent orifice; filled with a gelatinous sporidiferous mass.

SPECIFIC CHARACTER.

STROMATOSPHÆRIA typhina; *in culmis graminum parasitica, elongata, cylindrica, aurantiaca, carnosa, punctata, peritheciis ovatis, demum ore prominenti, thecis utrinque attenuatis, acutis.*

St. parasitic on the culms of grasses, elongated, cylindrical, orange colour, carnose, dotted: perithecia ovate, at length with a prominent orifice; thecæ attenuated and acute at each extremity.

DOTHIDEA typhina, *Fries, Syst.* v. 2. p. 553.

POLYSTIGMA typhinum, *De Cand. Mem. du Mus.* v. 3. p. 330.—*Grev. Fl. Edin.* p. 365.

SPHÆRIA typhina, *Pers. Ic. et Desc. Fung.* 1. p. 37. t. 7. f. 1.—*Syn. Fung.* p. 29.—*De Cand. Fl. Franç.* v. 2. p. 292.—*Ejusd. Syn.* p. 60.—*Alb. et Schw.* p. 13.—*Nees, Syst.* t. 41. f. 314.—*Schwein Fung. Carol.* No. 65.—*Holl. et Schmidt, Pl. Exsicc.* No. 4.—*Moug. et Nestl. Exsicc.* No. 79.—*Hook. Fl. Scot.* 2. p. 6.

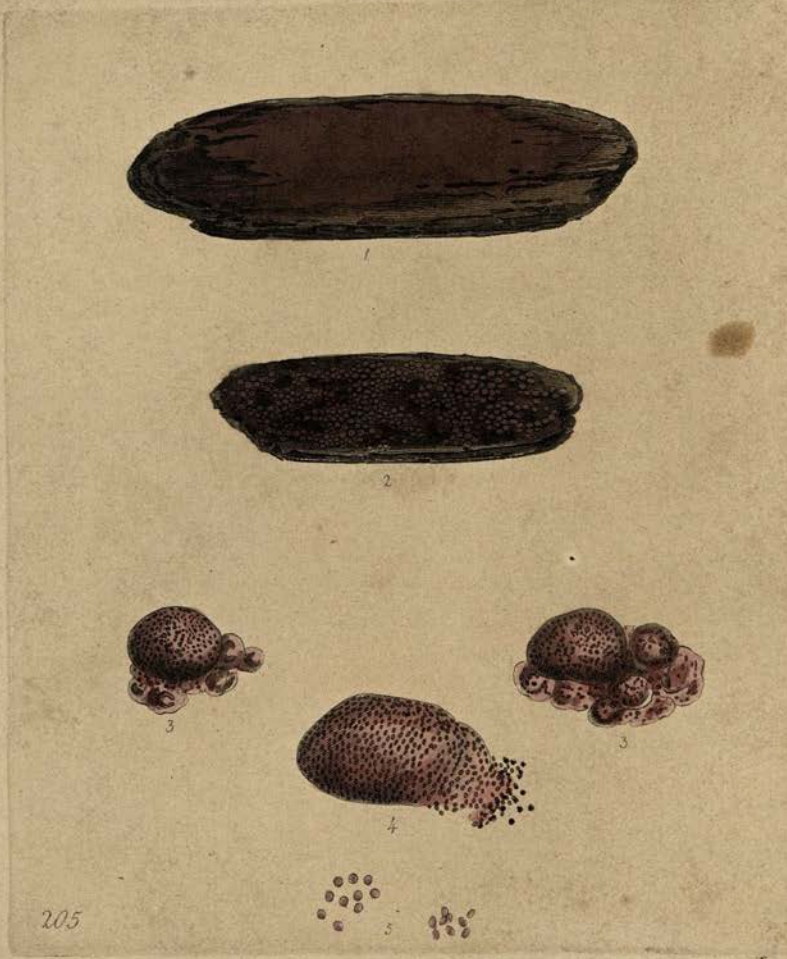
SPHÆRIA spiculifera, *Sow. Fung.* t. 274.—*Purt. Midl. Fl.* v. 2. p. 715.

HAB. On the culms of living Grasses; Summer, very frequent.

Plant half an inch to two inches in length, surrounding the culms of living grasses, of a bright orange-yellow colour. In its young state it is white, and of a soft fleshy consistence. In a few days, it acquires a yellow colour, and the receptacle becomes dotted on the surface, which, however, still remains smooth and even. In maturity, and as it grows old, the receptacle shrinks, while, in the place of the dots above mentioned, the orifices of the enlarged *perithecia* become prominent, and render the surface granulated. *Perithecia* horizontal, ovate, contiguous, yellow, of a carnose substance, their summits much rounded; filled with a gelatinous mass, containing the fructification. *Thecæ* numerous, slender, very attenuated and acute at each extremity, nearly as long as the *perithecia* themselves, containing 3–5 oblong yellow *sporidia*. When mature, the thecæ escape spontaneously from the perithecia.

It must be confessed, that, amidst the variety of pleasures experienced by the naturalist whose feelings are alive to the wonderful structures he is daily contemplating, he is occasionally sadly perplexed in his pursuit. Objects rise up of doubtful affinity, and produce a kind of pain in such minds as are intent upon the accuracies of systematic arrangement. The subject of the present description is an instance of this. Originally published as a *Sphœria* by PERSOON, it became a *Polystigma* in the memoir composed by DE CANDOLLE on that genus, in the Mémoires du Museum. M. FRIES has subsequently placed it among the *Dothideœ*; from which, again, I have presumed to remove it. M. FRIES has indeed observed, that it has a near affinity to *Sphœria*, but that, in consequence of its habit, he has arranged it with his *Dothidea* (*Polystigma* nobis) *rubra* and *fulva*. After making a most careful analysis of every part, I am inclined to think it should still remain among the true *Sphœroideœ*, and that I was wrong in the Flora Edinensis, where I considered it a *Polystigma*, in common with DE CANDOLLE. That a real receptacle is present, cannot be doubted, as the whole may be easily removed from the culm, as is indeed shewn in the figure published by NEES. (I have not seen that given by PERSOON.) In this respect, it differs essentially from *Polystigma rubrum* and *fulvum*, whose receptacle is innate, and formed by a modification of the substance of the leaf on which they grow. The *perithecia* in our plant are in no respect different from those of the carnose stipitate *Sphœriœ* (*Xylariœ* nobis); their near affinity being farther confirmed by the gelatinous mass of thecæ escaping spontaneously from the orifices. On the other hand, to the naked eye, and without dissection, scarcely any one would think of separating this curious plant from *Polystigma rubrum* and *fulvum*.

Fig. 1, 1. *St. typhina*, natural size. Fig. 2. *An entire plant.* Fig. 3. *A portion divided transversely.* Fig. 4. *A small portion in an old state, with full-sized perithecia.* Fig. 5. *A portion in which the perithecia are divided transversely.* Fig. 6. *A perithecium divided, filled with thecœ.* Fig. 7. *Thecœ.* Fig. 8. *Sporidia*; magnified.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PALMELLA CRUENTA.

Purple Palmella.

CLASS AND ORDER CRYPTOGAMIA ALGÆ, *Linn.*—NAT. ORD. *ALGÆ*, *Juss. Ag.*

GENERIC CHARACTER.

" *Gelatina hyalina, expansa vel globosa, granulis discretis globulosis vel ellipticis farcta.*"—AGARDH.

A hyaline gelatinous receptacle, spreading, globose, filled with distinct globular or elliptical granules.

SPECIFIC CHARACTER.

PALMELLA cruenta; *fronde crustæformi tenuissima, cruenta.*

P. frond crust-like, very thin, dark blood-colour.

PALMELLA cruenta, *Ag. Syst. Alg.* p. 15.

TREMELLA cruenta, *Smith, Engl. Bot.* t. 1800.—*Relh. Fl. Cant.* ed. 3. p. 509.—*Purt. Midl. Fl.* v. 2. p. 616.—*Hook. Fl. Scot.* 2. p. 32.—*Grev. Fl. Edin.* p. 427.

THELEPHORA? sanguinea, *Pers. Syn.* p. 575.

PHYTOCONIS purpurea, *Bory,*
BYSSUS purpurea, *Lamarck,* } *fide Agardh.*

HAB. On damp walls in shaded places, chiefly near the ground. Autumn to Spring. Plentiful around Edinburgh.

Plant spreading for many inches in the form of a very thin gelatinous crust on the surface of damp walls, especially when slightly covered with soil. Its colour is a fine rich dark purple. Under the microscope, the structure is very obvious; the gelatinous frond swells into globose portions, unequal in size, filled with a multitude of roundish or oval granules.

I trust no apology will be necessary for giving this *Alga* a place in the present work, as the representation in " English Botany" is simply that of its general appearance. Besides, along with, I hope, a careful analysis, I am now enabled to publish it as a true *Palmella*, in which genus it has been placed by AGARDH, with nine other species. Among these, are found four species, natives of Britain; the *Ulva protuberans* of Engl.

Bot., *Lichen botryoides*, Ach., *Tremella adnata*, Huds., and *Ulva montana*, Lightfoot.

Fig. 1. *Appearance of the plant*, natural size. Fig. 2. *The same, magnified.* Fig. 3. *Portion of the gelatinous crust or frond.* Fig. 4. *Fructified portion removed.* Fig. 5. *Granules;* magnified.

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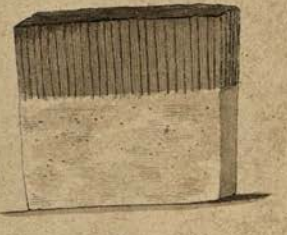

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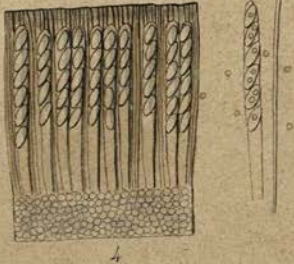

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CRYPTOMYCES Wauchii.

Willow Cryptomyces.

Class and Order CRYPTOGAMIA FUNGI, *Linn.*—Nat. Ord. *FUNGI, Link, Grev.*

GENERIC CHARACTER.

Fungus effusus, omnino adnatus, erumpens, planiusculus, carnosus. Hymenium omnem superficiem occupans. Thecæ erectæ. Sporidia magna ovalia.

Fungus spreading, quite adnate, bursting forth, nearly plane, carnose Hymenium covering the whole surface. Thecæ erect. Sporidia large, oval.

SPECIFIC CHARACTER.

Cryptomyces Wauchii; *suborbicularis, olivaceo-nigrescens, intus albus; thecæ elongatis obtusis, sporidiis numerosis.*

C. suborbicular, olivaceous, at length nearly black, white within; thecæ elongated, obtuse, containing numerous sporidia.

Hab. On the branches of a species of Willow *(Salix)*, by the river side, near Foxhall, Edinburgh. Summer and autumn, Captain Wauch.

Plant of a firm carnose substance, at first produced beneath the bark, which does not burst until the fungus is mature: it then cracks, and becomes revolute, exposing the surface of the fungus, which is perfectly adnate, about a line in thickness, and mostly about one-third to half an inch in diameter. Having once attacked a branch, it generally spreads all over it, up to the very twigs, and causing the epidermis to crack and fall off, in every direction. The surface is nearly smooth and even. The *hymenium* takes up about a third of the whole thickness, is of an olivaceous black exteriorly, and within also of a dark colour; the rest of the substance is white. *Thecæ* very long, linear, obtuse, mixed with *paraphyses*, and containing 4–6 large oval *sporidia*, in which a few globose *sporules* are perceptible. *Odour* strong, much resembling that of many of the larger fungi.

This very curious plant, discovered by my friend Captain Wauch in the course of the present season (1825), I have little hesitation in placing as a new genus among the true Fungi. It is difficult to say with what it has nearest affinity. In general habit, it might be supposed to resemble some species of

Thelephora, but there the comparison stops. Our plant, besides being produced under the epidermis, seems to belong to a more perfect group, when its structure is examined. The hymenium is a quite distinct substance from that of the receptacle. The fructification is fully and beautifully developed, a good deal similar to that of the *Helvellæ*. The receptacle is carnose and white; and the whole exhales a very strong odour, precisely like what is universally known under the name of a fungus-like smell.

Till the plant is perfected, it remains concealed beneath the epidermis; and on this account I have named the genus *Cryptomyces*. The epidermis, in fact, scarcely seems to crack by the swelling of the fungus, more than by the natural consequence of being killed by its separation from the subjacent bark.

A cluster of willows, which was attacked in the beginning of the season by this plant, have been nearly destroyed by it, and, from the rapidity of its progress, I have no doubt that a whole plantation might, in the course of a couple of seasons, be rendered good for nothing. At a little distance, the affected branches look as if they were dry, scorched, and rotten.

Fig. 1. *Cryptomyces Wauchii*, natural size. Fig. 2. *A section of a plant.* Fig. 3. *A portion of the hymenium and receptacle.* Fig. 4. *Hymenium, with fructification.* Fig. 5. *Sporidia and sporules;* magnified.

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POLYPORUS SQUAMOSUS.

Great scaly Polyporus.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *FUNGI, Link, Grev.*

GENERIC CHARACTER.

Hymenium cum pilei substantia homogeneum et concretum, poris dissepimentis tenuibus simplicibus instructum.—Pileus subcarnosus vel suberosus, plerumque sub-sessilis, substantia fibrosa sicca.

Hymenium of the same substance as the pileus, not separating from it, and furnished with pores, connected by simple dissepiments.—Pileus subcarnose or corky, mostly subsessile; substance fibrous and dry.

SPECIFIC CHARACTER.

POLYPORUS squamosus; *amplus; pileo carnoso, subochraceo, plus minusve squamoso; poris pallidis; stipite sublaterali obeso.*

P. large; pileus carnose, of a somewhat ochraceous colour, more or less scaly; pores whitish; stipes sublateral, thick and swelling.

POLYPORUS squamosus, *Fries, Syst.* v. 1. p. 343.—*Grev. Fl. Edin.* p. 399.

BOLETUS squamosus, *Huds. Fl. Angl.* p. 626.—*Bolt. Fung.* t. 77.—*Relh. Fl. Cantab.* ed. 3. p. 547.—*With. Bot. Arr.* ed. 6. v. 4. p. 388.—*Fl. Dan.* t. 1196.—*Sow. Fung.* t. 266.—*Purt. Midl. Fl.* v. 2. p. 666.—*Hook. Fl. Lond. New Series,* cum ic.—*Fl. Scot.* pt. 2. p. 27.

BOLETUS platyporus, *Pers. Disp. Fung.* p. 27.—*Comment.* p. 40.—*Syn. Fung.* p. 521.—*Alb. et Schw.* p. 245.

BOLETUS Juglandis, *Bull. Champ.* p. 344. t. 19.—*Schœff. Fung.* t. 101, 102.—*De Cand. Fl. Franç.* v. 2. p. 121.—*Ejusd. Syn.* p. 25.

BOLETUS polymorphus, *Bull. Champ.* t. 114.

BOLETUS rangiferinus, *Bolt. Fung.* t. 138.

BOLETUS cellulosus, *Lightf. Fl. Scot.* p. 1032.

BOLETUS subsquamosus, *Batsch. Fung.* t. 10. f. 41.

POLYPORUS sessilis, convexo-planus, poris amplissimis albidis, *Hall. Hist.* 2278.

AURICULA flammea Malchi, *Sterb. Fung.* t. 13, 14.

HAB. On stumps and decaying trunks of trees, especially those of the Ash (*Fraxinus excelsior*). Autumn. Very common.

Pileus in the very young state scarcely more than the diameter of the stipes, but it rapidly enlarges, and ultimately attains a foot or more in breadth. In its form it is exceedingly irregular, but most commonly it is rather orbicular, at first slightly convex, then plane, and at length concave, the margin somewhat waved, entire, rarely lobed. *Colour* ochraceous, darker in the centre. *Surface* covered more or less with appressed (rarely

revolute), fimbriated, reddish blotchy scales. *Substance* white within, fleshy, rather firm. *Pores* yellowish-white, very large, irregular, towards the stipes becoming very shallow, often pentagonal or hexagonal, and ending in a mere reticulation. *Stipes* variable; lateral, sublateral, or, rarely, subcentrical, very short and unequally thickened, or much elongated: in the latter state it is frequently branched in rather a palmate manner, the summits being either quite simple, or the terminating pileus imperfectly developed: this is the *Boletus rangiferinus* of authors. The stipes is always solid, blackish at the base, paler upwards.

Polyporus squamosus is the largest of British fungi, and one of the best known. On the Continent of Europe, it is extremely frequent, and sometimes eaten, though, it would appear from the evidence of some who have partaken of it, that its effects are sometimes injurious. PERSOON has not introduced it into his "Traité sur les Champignons comestibles," under either the name of *platyporus*, *squamosus*, or *Juglandis*; but he has *Bol. subsquamosus*, which we consider the same species. He says nothing about its properties, and simply states, on the authority of WULFEN, that it is eaten in Carinthia, where it is known under the name of *Herrenschwamm*. In France, we learn from DE CANDOLLE, that it is called *Miellin*, *Langou*, and *Oreille d'orme*. From what we already know, however, of these plants, we should presume it to be unwholesome, notwithstanding the report of the natives abroad; and we are borne out in this by the testimony of BULLIARD, and by CURTIS and HOOKER in the Flora Londinensis.

This species sometimes attains to an enormous size. My esteemed friend Dr HOOKER relates an instance given him by Mr HOPKIRK, of one which measured 7 feet 5 inches in circumference, and weighed, after having been cut four days, 34 lb. avoirdupois. It was only four weeks in attaining the above size, gaining thus an acquisition of weight of above 1 lb. 3 oz. in the day.—*Fl. Scot.*

I apprehend M. FRIES has erred in quoting BATTARRA, t. 37. f. A, B, as that author expressly mentions the pores as "minutissimis tubulis."

Fig. 1. *A mature plant, with two very young ones at the base.* Fig. 2. *A small portion of the pileus, with the pores;* natural size. Fig. 3. *Section of pores;* magnified.

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EXOSPORIUM TILIÆ.

Linden Exosporium.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *EPIPHYTÆ, Link.*

GENERIC CHARACTER.

Sporidia cylindrica, obscura, annulata, stromati globoso innata, sursum libera, persistentia.—NEES.

Sporidia cylindrical, obscure, transversely divided, innate on a globose receptacle, free upwards, persistent.

SPECIFIC CHARACTER.

EXOSPORIUM Tiliæ; *gregarium, atrum, minutum, convexum, sporidiis elongatis obtusis subquinque-septatis.*

E. gregarious, black, minute, convex, the sporidia elongated, obtuse, about five times transversely divided.

EXOSPORIUM Tiliæ, *Link, in Berl. Mag.* v. 3. p. 10.—*Nees, Syst.* p. 8. t. 2. f. 30.—*Holl et Schmidt, Deutschl. Schwaem.* No. 43.

HAB. On the dead branches of different species of Linden *(Tilia)*, frequent. Braid Hermitage, September.

Entire plant about one-third of a line in diameter, rarely larger, very gregarious, deep black, convex, bursting from beneath the epidermis, and appearing bristly under a pocket magnifier. *Sporidia* very crowded, elongated, obtuse at the apex, subopaque, divided transversely about five times, fixed at the base upon a roundish, dark-coloured, solid receptacle, and there persistent.

Common as this little plant appears to be, I believe it is here both figured and described for the first time as a native of this country. The reader, if he has been accustomed to study these minute productions at all, cannot fail to remark the resemblance between the sporidia of this plant and *Sporidermium atrum*, t. 194. I was uncertain, when I published the latter, whether to regard the bodies of which it is composed as

a kind of thallus or as sporidia. I am now inclined to regard them as sporidia, though, if that be the case, the entire plant is nothing but one mass of them, or, rather, each of the club-shaped bodies is a distinct plant by itself.

Fig. 1. *Plants,* natural size. Fig. 2. *Plants,* mgnified. Fig. 3. *Section of a plant.* Fig. 4. *Sporidia removed;* magnified.

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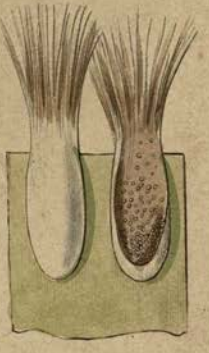
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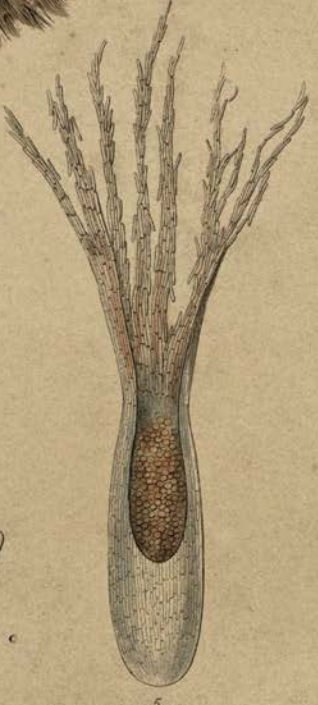
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ÆCIDIUM LACERATUM.

Brown ragged Æcidium.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *GASTROMYCI, Link, Grev.*

GENERIC CHARACTER.

Peridia foliis vivis parasitica, membranacea, apice dehiscentia, ore dentato vel lacerato. Sporidia globosa, minutissima, libera, pulverulenta.

Peridia parasitic on living leaves, membranaceous, bursting at the apex, the orifice dentate or torn. Sporidia very minute, pulverulent.

SPECIFIC CHARACTER.

ÆCIDIUM laceratum; *peridia densissime aggregata, elongata, subimmersa, pallido-brunnea, irregulariter lacerata; sporidiis brunneis, profusis.*

Æ. peridia densely aggregated, elongated, subimmersed, pale brown, irregularly torn; sporidia brown, copious.

ÆCIDIUM laceratum, *Sow. Fung.* t. 318.—*De Cand. Fl. Franç.* v. 2. p. 247.—*Ejusd. Syn.* p. 51.—*Grev. Fl. Edin.* p. 447.

ÆCIDIUM Oxycanthæ, *Pers. Syn. Fung.* p. 206.—*Alb. et Schw.* p. 115.—*Schwein. Fung. Carol.* No. 432.

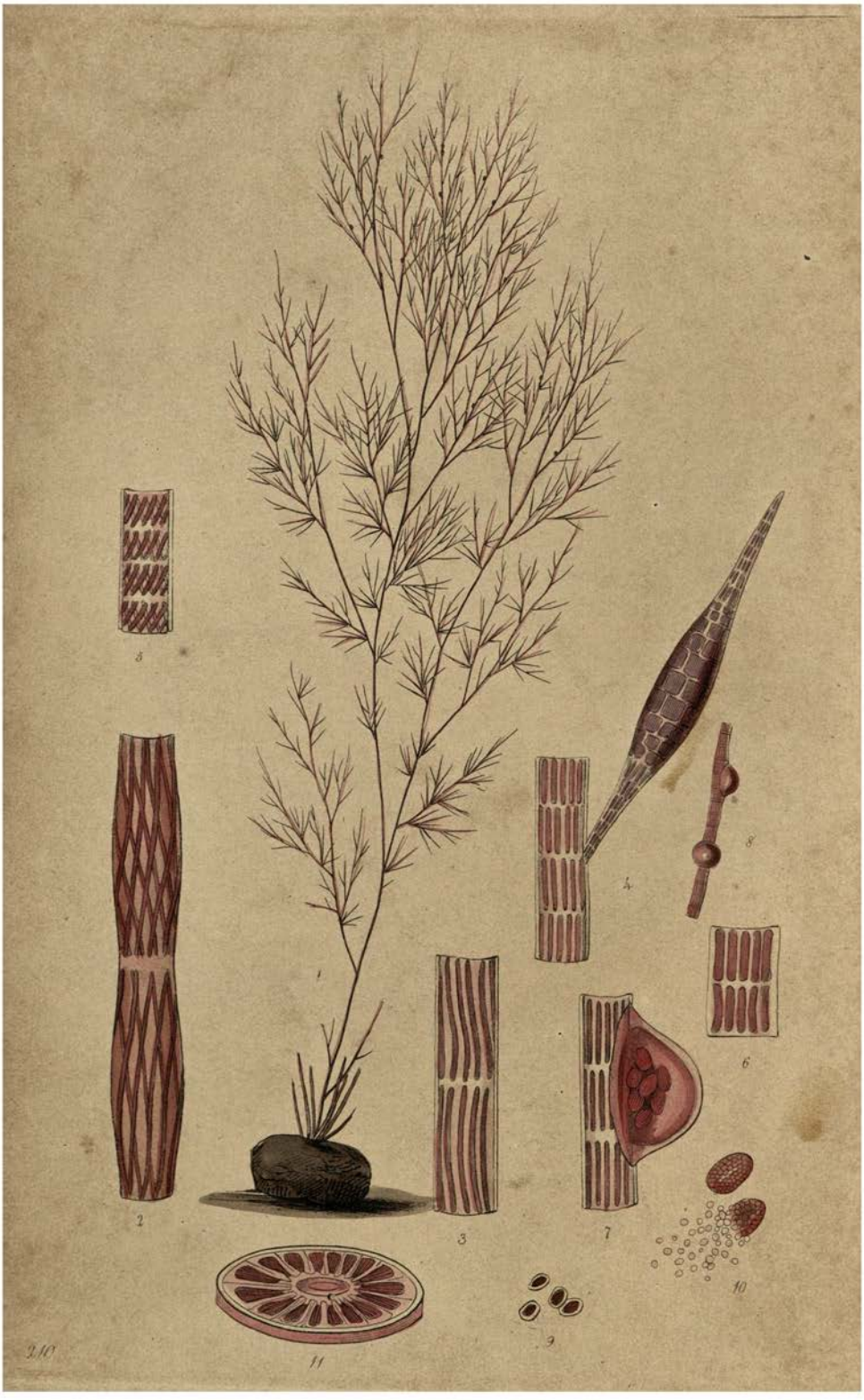
HAB. On the nerves and petiols of the leaves, the fruit, and even the young branches of the Hawthorn (*Cratægus Oxycanthus*), in summer and autumn, abundant everywhere.

Plant distorting and swelling the part on which it grows. *Peridia* clustered, linear-oblong, more than half-immersed; when young entire, then splitting at the apex, and, as they protrude, becoming torn in a very irregular manner to the base of the protruded portion. The lacerated part appears in the form of filaments to the eye, and even under a pocket magnifier; these apparent filaments, which are very numerous, turn out under a higher magnifying power, to be composed of nothing more than a number of linear, hyaline cellules, arranged lengthwise, which separate from one another with the greatest facility, and, after the laceration has taken place, are constantly falling away one by one, till scarcely any appearance of filament remains. The *colour* of the immersed portion of the peridium is quite white, that of the protruded portion of a pale brown. *Sporidia* globose, very copious, easily escaping, pale brown.

Of all the *Æcidia* which have come under my observation, I have seen none more truly curious than the subject of the present description. As well as other botanists, I had imagined the lacerated portion of the peridium to be really filamentous, such as that of *Æ. cancellatum* is said to be, and so represented by SOWERBY, but which I have had no opportunity of verifying. Instead of this, however, I beheld under the microscope a mass of transparent bodies, which, when *in situ*, form a series of cellules. These cellules, however, appeared to have scarcely any attachment to each other, and separated with a touch. The consequence is, when they are examined, some are seen adhering by a portion of the side, some by one end, and all dropping off, as if their presence was no longer necessary after the sporidia ceased to require protection. I have examined this plant frequently since, and have always observed the same phenomenon. That the peridium should possess such a structure to begin with, is highly curious; but, from what I have observed in this species, it seems probable that it is not really cellular, according to the acceptation of the term in higher orders of plants (as has been supposed), but is at present *sui generis*, and requiring farther investigation.

SOWERBY and PERSOON published this species in the same year; but SOWERBY has the precedence by three months, his plate having appeared in January, and PERSOON's Synopsis in March. As DE CANDOLLE does not quote SOWERBY, it would almost appear that he had accidentally selected the same name.

Fig. 1. *Plants,* natural size. Fig. 2. *A young peridium, protruding itself.* Fig. 3. *The fruit of the Cratægus transversely divided, shewing the circumference set round with the Æcidium.* Fig. 4. *Two peridia.* Fig. 5. *A peridium removed, and exhibiting the remarkable disintegration of the lacerated portion.* Fig. 6. *Sporidia.* Fig. 7. *The transparent bodies, which form the peridium, represented in connection, and resembling a cellular structure.* Fig. 8. *The same bodies in a separate state;* magnified.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POLYSIPHONIA AGARDHIANA.

Rigid sessile-fruited Polysiphonia.

CLASS AND ORDER CRYPTOGAMIA ALGÆ, *Linn.*—NAT. ORD. *ALGÆ, Juss.*

GENERIC CHARACTER.

Frons filiformis (rubra), ramosa, articulata; articuli tubulis pluribus internis striati. Fructificatio duplex, tubercula externa aut apicibus ramulorum innata.

Frond filiform (red), branched, articulated; articulations striated with several internal tubes. Fructification double; external tubercles or innate ones towards the summit of the branches.

SPECIFIC CHARACTER.

POLYSIPHONIA Agardhiana; *filis elongatis, ramosis, rigidiusculis, ramulis subfasciculatis basi apiceque attenuatis, articulis inferioribus diametro duplo vel triplo longioribus, superioribus subæqualibus; capsulis rotundato-convexis omnino sessilibus.*

P. filiform frond elongated, branched, somewhat rigid, ramuli subfaciculate, attenuated at the base and the apex, the lower articulations twice or thrice as long as their diameter, the upper ones nearly as long as broad; capsules rotundato-convex, quite sessile.

HAB. On stones in the sea. Appin, Captain CARMICHAEL. Frith of Forth, only near Kinghorn, but there tolerably plentiful. Summer.

Frond 6–12 inches long, of a full red colour when growing, becoming blackish or very dark when dried, much and irregularly branched, rather rigid; *branches* erect, variously divided, the ramuli 2–3 lines in length, attenuated at the base and apex, and mostly given off in a fasciculate manner, especially towards the lower part of the plant. The *articulations* vary somewhat in the same parts. The *lower ones* are from 2–3 times longer than their diameter, sometimes, though rarely, contracted at the joint: *articulations of the branches* about as long as they are broad, with 5 evident striæ; nearer the summit they become rather shorter. In the *ramuli* (many of which are considerably thickened in the middle), the articulations are very short, but the striæ change their figure, to accommodate the diameter of the part; some of them have become in this way oblong, many even nearly square. *Capsule* appearing like a sessile tubercle, globoso-convex, fixed by a very broad base to the branches, containing 6–10 granules, which appear to be composed of a mass of minute, roundish, reproductive particles or seeds. In the young state it adheres to paper; when mature, very imperfectly.

This species belongs to the tribe of the genus "*Fastigiatæ*. —Exsiccatione totæ nigræ vel nigro-fuscæ, rigidiusculæ, chartæ vix adhærentes," of AGARDH. As I cannot find any plant to which it can be referred, in his recently published System, it may, with some certainty, be proposed as a new species. While the artist was employed upon the plate, I had the pleasure of receiving it from Captain CARMICHAEL, who also finds it at Appin. From the manner in which it grows where I discovered it near Edinburgh, I should conjecture it to be far from uncommon, yet I have never seen it elsewhere than in one spot.

AGARDH has continued to keep up the genus *Hutchinsia* in his Systema, on account (as he observes in a letter) of the heterogeneous nature of the phanerogamic genus of the same name, which he thinks cannot long be sustained. I regret being obliged to differ from my friend on this point; for, as long as *Hutchinsia* is the prior name for a genus of cruciferous plants, and continues to remain so, it can scarcely be admitted among the *Algæ*. For this reason, I have presumed to keep up my own name for the genus in question.

The specific appellation I have bestowed in honour of the the above-named great Swedish Algologist, the author of the only general arrangement of *Algæ*.

Fig. 1. *Plant*, natural size. Fig. 2. *Occasional appearance of the articulations of the lower part of the stem.* Fig. 3. *Articulations of the stem and main branches.* Fig. 4. *Articulations of the branches, along with one of the ramuli.* Fig. 5. *Occasional appearance of the upper articulations of the branches.* Fig. 6. *Another view of articulations from the branches.* Fig. 7. *Portion of a branch, with a capsule.* Fig. 8. *Less magnified view of capsules.* Fig. 9. *Granules removed from the capsule.* Fig. 10. *Granules dispersing their seeds.* Fig. 11. *Section of the stem;* magnified.

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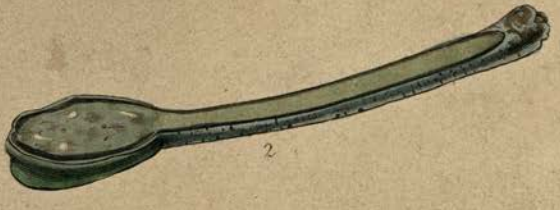

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GEOGLOSSUM VIRIDE.

Green Earth-tongue.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *FUNGI, Link, Grev.*

GENERIC CHARACTER.

Hymenium breve, claviforme, stipitatum, plerumque compressum, a stipite subdistinctum, sed vero discretum.—Genus colore nigricante vel obscure viridi.

Hymenium short, club-shaped, furnished with a stipes, mostly compressed, somewhat confluent with the stipes, but truly distinct.—Colour of the whole genus black, or dull green.

SPECIFIC CHARACTER.

GEOGLOSSUM viride; *viride, subfasciculare, hymenium distinctum, stipite squamuloso.*

G. green, somewhat fasciculate; hymenium distinct; stipes minutely scaly.

GEOGLOSSUM viride, *Pers. Comment.* p. 40.—*Syn. Fung.* p. 610.—*Mycol. Europ.* 1. p. 195.—*Alb. et Schwein.* p. 294.—*Ditm. in Sturm. Fung.* t. 48.—*Fries, Syst.* v. 1. p. 489.—*Nees, Syst.* t. 17. f. 158.—*Schum. Sælland,* p. 408.—*Kunze et Schmidt, Mycol. Heft.* 1. p. 104.

GEOGLOSSUM glutinosum, *Nees, Syst.* t. 17. f. 159. (non. *Pers.*)

CLAVARIA viridis, *Schrad. in Gmel. Syst. Nat.* 2. p. 1443.—*Fl. Dan.* t. 1258. f. 1.

CLAVARIA mitrata, *var.* viridis, *Holmsk. Ot.* 1. p. 24. *cum ic.*

CLAVARIA serpentina, *Schrank. Bav.* 2. p. 571. fid. *Pers.*—*Mull. Zool. Dan.* p. 256.

CLAVARIA indivisa, viridis, rugosa et compressa, *Hall. Hist.* p. 125. No. 2205.

CLAVARIA, quæ Fungus ophioglossoides, viridis, serpentiformis, *Mich. Nov. Pl. Gen.* p. 208. No. 7.

HAB. Moist grassy or shady places in autumn. Very rare in Great Britain. Banks of the Tweed near Melrose, Mr WALKER ARNOTT. Appin, Captain CARMICHAEL.

Plant from one to near three inches in height, gregarious, solitary or several growing together, and more or less united at the base in a fasciculate manner. *Clavula* distinct, mostly somewhat oblong, and not unfrequently compressed and wedge-shaped at the apex, deep green, almost gelatinous in moist weather. *Stipes* cylindrical, squamulose, of a pale verdigris-green colour. *Hymenium* covering the whole *clavula: theccæ* long, intermixed with paraphyses, containing about eight oblong *sporidia.*

Most of the *Geoglossa* are not remarkable for their beauty; the present species is, however, an exception, being of an extremely pleasing colour, both in the pileus or clavula, and the stipes. It is here also both figured and described for the first time as a British plant.

The specimens kindly communicated to me by Captain CARMICHAEL, were accompanied by a coloured drawing, which agreed pretty exactly with the memorandum I had made from those received from Mr WALKER ARNOTT two years before, except that the clavula in Captain CARMICHAEL's drawing was not so dark-coloured as in mine, or in the figures published by DITMAR, NEES and HOLMSKIOLD. In this respect, however, the plant is notoriously liable to vary.

In the dissection of the hymenium, I did not succeed in tracing the divisions of the sporidia, as represented in the otherwise tolerably characteristic figure of DITMAR, in the Fungi of STURM's Flora Germanica. The sketch of that part transmitted to me by Captain CARMICHAEL, I found as faithful as that naturalist's details always are. The remarkable sporidia so conspicuous in *G. viscosum* and *hirsutum*, already represented in this work, are in the present species entirely wanting, which, if it were possible to set aside the general habit and external characters of the plant, would indicate a generic difference.

Fig. 1. *Plants, in different states,* natural size. Fig. 2. *A plant longitudinally divided.* Fig. 3. *A portion of the hymenium.* Fig. 4. *Thecæ and paraphyses.* Fig. 5. *Sporidia ;*—magnified.

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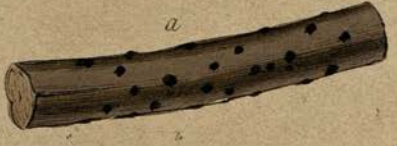

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STILBOSPORA PROFUSA.

Profuse Stilbospora.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *EPIPHYTÆ, Link.*

GENERIC CHARACTER.

Sporidia nuda, libera, subopaca, ovata vel oblonga, simplicia aut obscure septata, in acervos irregulares coacervata.

Sporidia naked, free, subopaque, ovate or oblong, simple or obscurely annulated, forming little irregular heaps.

SPECIFIC CHARACTER.

STILBOSPORA profusa; *acervi majores, sporidiis minutissimis subæqualiter biloculatis.*

ST. heaps rather large, the sporidia extremely minute, nearly equally 2-celled.

HAB. On Beech and Sycamore branches (*Fagus sylvatica* et *Acer pseudoplatanus*) about Edinburgh, in the spring.

Sporidia nearly equally 2-celled, very minute, extremely copious, exuded from beneath the epidermis, and forming little, rather conical, intensely black heaps, 1–2 or more lines in breadth, often confluent, and very gregarious.

The genus *Stilbospora*, first constituted, I believe, by HOFFMANN, has very few species: it is not therefore difficult to ascertain those which have been already described, though the microscope is necessary for that purpose, on account of the principal character being derived from the nature of the sporidia. The present species seems to be quite new, and well distinguished by the minuteness and distinct structure of the sporidia.

Fig. 1. a, *Plants*, natural size. b, *Plants vertically divided, one being still within the epidermis, the other having partly escaped.* c, *Sporidia*;—magnified.

STILBOSPORA OVATA.

Ovate Stilbospora.

SPECIFIC CHARACTER.

STILBOSPORA ovata; *acervi parvi, sporidiis ovatis, uniloculatis.*

ST. heaps small, sporidia ovate, unilocular.

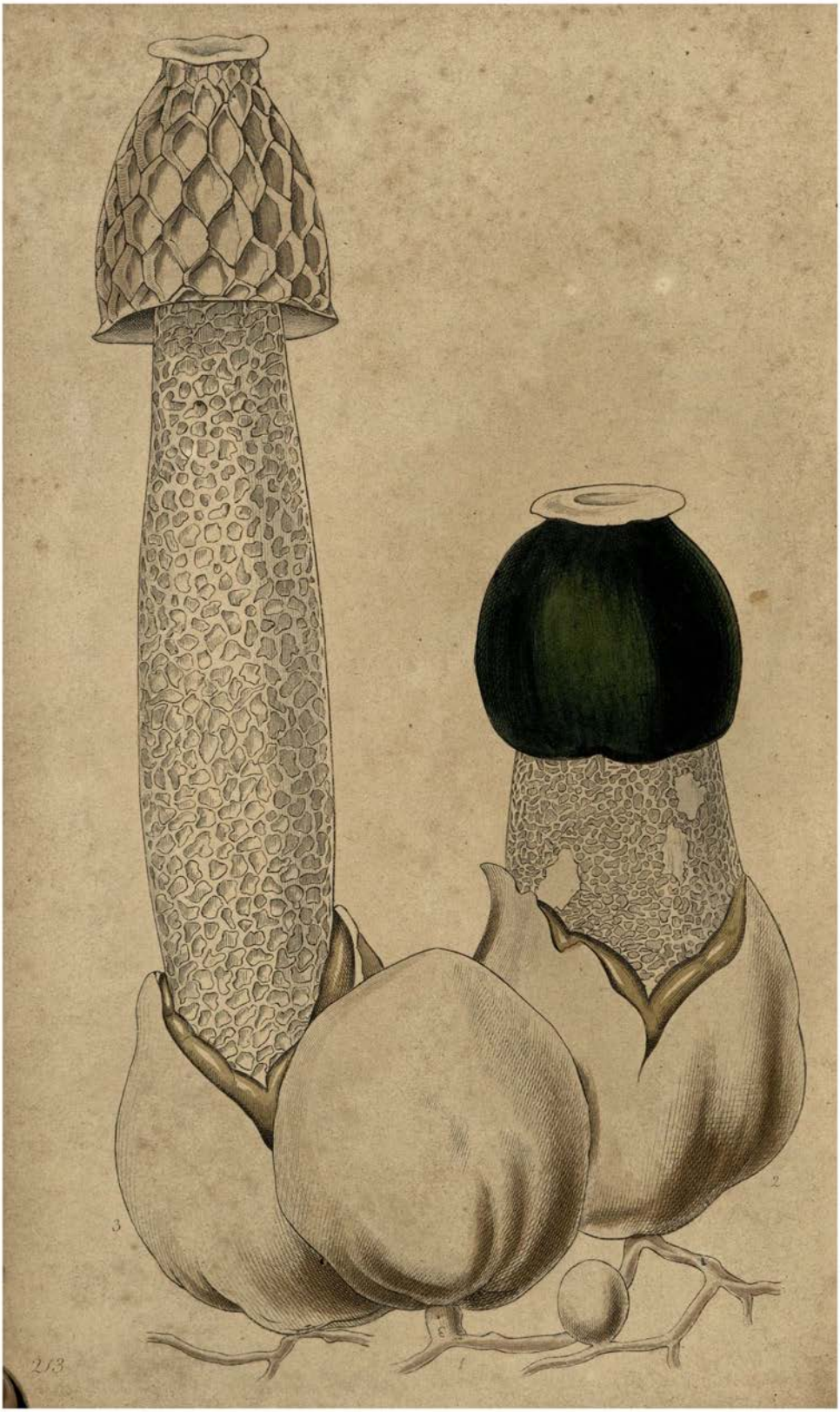
STILBOSPORA ovata, *Pers. Obs. Mycol.* 1. p. 31. t. 2. f. 2.—*Syn. Fung.* p. 96. —*Alb. et Schwein.* p. 53.—*Schwein. Fung. Carol.* No. 509.

HAB. On dead branches of trees, in autumn. About Edinburgh.

Sporidia ovate, rather large for the genus, not very numerous, subopaque, not divided by any septa, forming little black convex *heaps*, less than a line in diameter.

This species is first described by PERSOON in his Observationes Mycologicæ, where he also gives a tolerably exact figure of the sporidia, which he expressly says are destitute of distinct septa. We find him subsequently, in the Synopsis Fungorum, referring his plant to HOFFMANN's *St. pyriformis*. ALBERTINI and SCHWEINITZ observe, that the specimens they discovered in Lusatia agreed exactly with PERSOON's figure, but not with that of HOFFMANN; "forma cum icone Persooniana exacte convenientes, at figura Hoffmanniana nonne aliorsum pertinet?" STEUDEL, in his Nomenclator Botanicus, follows PERSOON in considering these two plants as the same, and only keeps up *St. pyriformis*. I have not access to HOFFMANN's figure, but I have examined the specimens published by FRIES, in the Scleromyceti Sueciæ, of the true *St. pyriformis*, and find it to differ in every particular from *St. ovata*, being of a much longer form, and divided by 3–4 very distinct septa.

Fig. 2. a, *Plants*, natural size. b, *Sporidia*, magnified.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PHALLUS. FŒTIDUS.

Stink-horns,—Stinking Morell.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *FUNGI, Brong.* —GASTROMYCI, *Link.*

GENERIC CHARACTER.

Volva duplex. Stipes elongatus, fistulosus. Pileus conicus externe substantia mucosa sporidifera tectus.

Volva double. Stipes elongated, hollow. Pileus conical, covered externally by a mucose substance which contains the sporidia.

SPECIFIC CHARACTER.

PHALLUS fœtidus; *volva globoso-ovata, stipite albido cribroso, pileo celluloso substantia mucosa decidua viridi tecto, sporidiis copiosissimis globosis.*

P. volva roundish-ovate, stipes white, full of small cavities, pileus cellulose, covered with a green mucose deciduous substance, sporidia exceedingly copious, globose.

PHALLUS fœtidus, *Lam. Fl. Franç.* ed. 1. v. 1. p. 121.—*Sow. Fung* t. 329.—*Hook. Fl. Lond. New Series, cum ic.*—*Fl. Scot.* 2. p. 18.—*Purt. Midl. Fl.* v. 2. p. 693.—*Grev. Fl. Edin.* p. 418.

PHALLUS impudicus, *Linn. Sp. Pl.* p. 1648.—*Bull. Champ.* p. 276. t. 182.—*Œd. Fl. Dan.* t. 175.—*Schœff. Fung.* t. 196.-8.—*Ejusd. Dissert.* t. 1.-5. *Berg. Phyt.* 122.—*Bolt. Fung.* t. 92.—*Huds. Fl. Angl.* p. 629.—*Scop. Fl. Carn.* No. 1605.—*Lightf. Fl. Scot.* p. 1044.—*Curt. Fl. Lond.* ed. 1.—*With. Bot. Arr.* ed. 6. v. 4. p. 428.—*Pers. Syn. Fung.* p. 243.—*Alb. et Schwein.* p. 140.—*De Cand. Fl. Franç.* ed. 3. v. 2. p. 214.—*Ejusd. Syn.* p. 43.—*Sibth. Fl. Oxon.* No. 1076.—*Relh. Fl. Cant.* ed. 3. p. 561.—*Nees, Syst.* p. 65. t. 36.—*Schwein. Fung. Carol.* No. 535.

PHALLUS volvatus, *Batsch.* fasc. 1. p. 133. No. 10.

PHALLUS hollandicus, *Park. Herb.* p. 1322. No. 13. *text, but not the cut.*

PHALLUS vulgaris, totus albus, volva rotunda, pileolo cellulato, ac summa parte umbilico pervio, ornato, *Mich. Nov. Pl. Gen.* p. 201. t. 83.

PHALLUS volva exceptus, capituli apice pervio, *Linn. Hort. Cliff.* 478.—*Gled. Meth. Fung.* p. 55.

BOLETUS Phalloides, *Tourn. Inst.* 1. p. 562.—*Batt. Fung.* 23. t. 11. f. A.–D. —*Sterb. Fung.* t. 10. et t. 30. f. A.–D. *fid. Bull.*

BOLETUS Phallum referens, *Rupp. Fl. Jen.* p. 203.

FUNGUS fœtidus, &c. *C. Bauh. Pin.* p. 374.

FUNGUS Phalloides, *J. Bauh. Hist. Pl.* p. 842.—*Ray, Syn.* p. 12.

FUNGUS Phalloides virginianus, glande tessellato, *Ray, Hist. Pl.* v. 3. p. 25.?

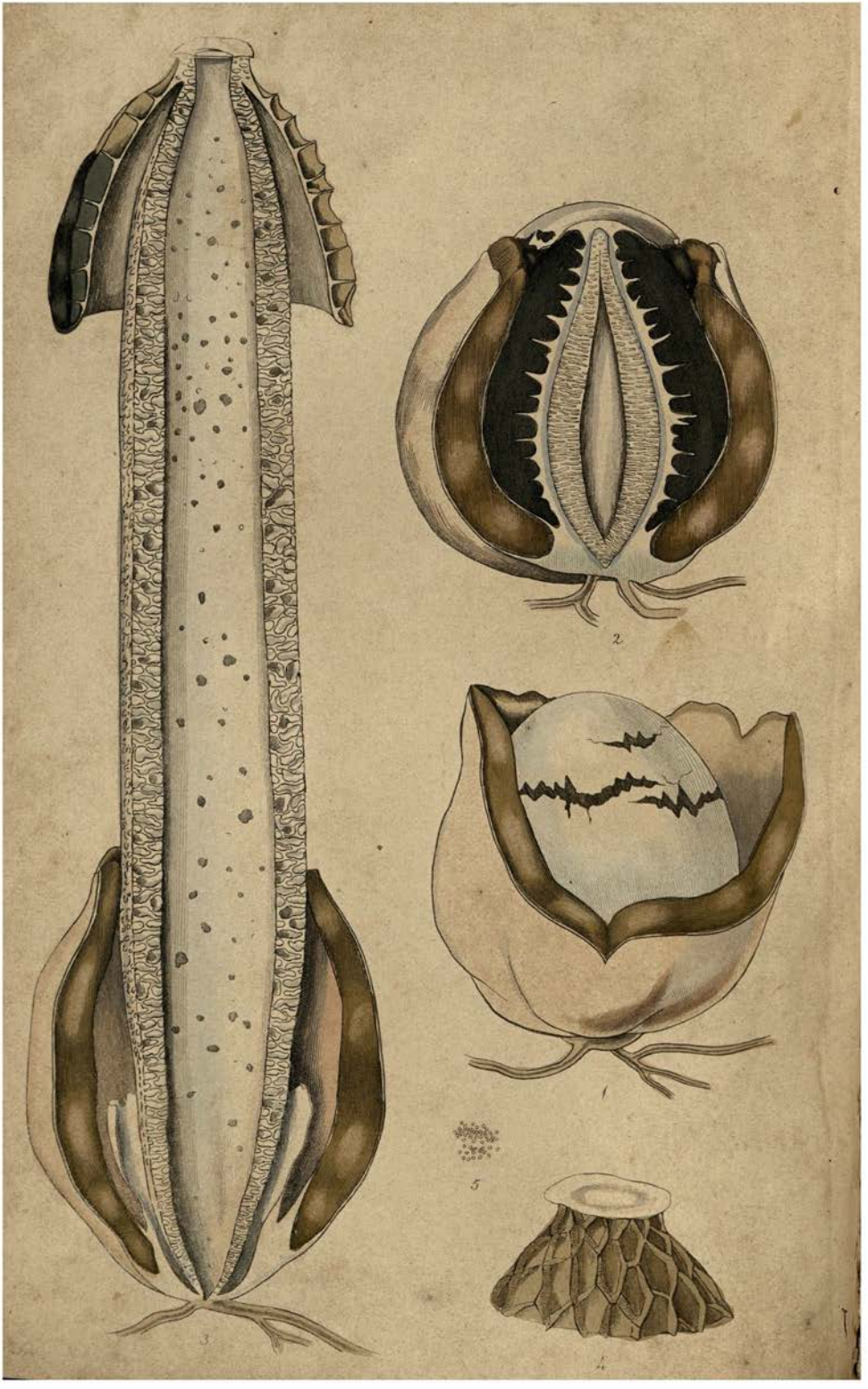
FUNGUS, &c. *Lobel. Icon.* t. 309.

FUNGORUM noxiorum, generis xxiii. sp. 5. *Clust. Hist.* p. 286.

HAB. Frequent in sandy, gravelly, and light loamy soils, in hedges, woods and plantations. Summer. Common about Edinburgh, and many other parts of Scotland. In England, it is also not unfrequent in most counties.

Root creeping, branching, fibrous, round, 1–2 lines in thickness, throwing up here and there the young plants, which may be traced from the size of a pea, or even less, up to the full formed volva, protruding its summit above the surface of the ground, and containing within it the future plant. *Volva* as large or larger than a hen's egg, roundish-ovate, white, smooth and heavy; on dissection, the volva is found to be double: the *outer* one is composed of an external thickish white coat, with a dull amber-coloured jelly-like substance, one-third of an inch in diameter, lining its interior surface. From near the base, interiorly, arises the *inner volva*, given off by the outer one beneath where the jelly terminates; this inner volva, which immediately envelopes the stipes and pileus, is of a white colour, and very delicate; about an inch of it is generally left entire at the base when the plant bursts its confinement, and a small portion remains attached to the edge of the small plane summit of the pileus. *Stipes*, when enclosed in the volva, about 2 inches in length; but after that part is ruptured, acquiring 4–6 additional inches in the course of as many hours: when thus mature, it is an inch to an inch and a half thick, white, hollow, and its whole substance cellulose, or perforated with largish holes; it is very brittle, straight, or slightly curved, and attenuated at each extremity. *Pileus* conical, or rather campanulate, above an inch in height, the apex contracted, flat, white, with a small thin projecting margin, and central depression, free, smooth underneath, outwardly pitted like a honeycomb, the cells containing a quantity of a slimy, dark green, stinking substance, in which the innumerable very minute globose *sporidia* are dispersed. So very offensive is the smell of this substance, that it is seldom allowed to drop away according to the course of nature, but is generally consumed in a few hours by flesh-flies. The summit of the pileus, said by many authors to be pervious, is certainly oftener closed.

The subject of the present description is by no means uncommon, but in regard to curious structure yields to none of its Order. In the summer months, and beginning of autumn, the exceedingly offensive effluvium which it exhales, is perceptible at a distance of twenty yards, in woods and hedge-rows; and many who are well acquainted with its powerful odour, are ignorant of the singular production from which it arises. Not the least remarkable of its properties, is the truly marvellous rapidity of its growth. In bursting the volva or egg-like covering which envelopes the rest of the fungus, considerable force is required. BULLIARD affirms that the rupture is sometimes accompanied with a report as loud as that of a pistol; and that if



it be placed in a glass or earthen-ware vessel, just large enough to receive it, with a little water at the bottom, the vessel is broken when the volva bursts. In the course of five or six hours after the stipes escapes from its prison, it attains to its extreme elevation, which is usually six or eight inches. In regarding this wonderfully rapid elongation, it is worth while to remark, that, while the stipes is confined within the volva, the cellules which occupy the greater part of its substance, are so much vertically compressed as to resemble crowded horizontal short lines; on the other hand, when it is mature, the cellules are roundish. It is probable, therefore, that the mere vertical dilatation of so many compressed cavities, greatly facilitates this phenomenon. Before closing my remarks on the stipes, I will venture to suggest, that the jelly-like substance of the volva seems intended, in part at least, to strengthen the sides; for if we examine the base of the stipes, we shall find it diminishing nearly to a point, and that it could never remain erect without the support which it derives from the volva, which closely embraces it,—an assistance the volva could not afford, unless it had been rendered firm by the jelly, or some other substitute.

The pileus, immediately after bursting from the volva, is covered with a dark olive-green soft substance of considerable thickness, except at the contracted apex, which is white, flat, naked, with a central depression, sometimes an orifice. In the course of a few hours, the green substance begins to liquefy and drop off, and exhale the odour peculiar to this plant; after the greater part has disappeared, the cells of the pileus are rendered visible. Flies are so fond of this slimy matter, that it is always greedily devoured; at the same time, it has been correctly observed in "Flora Londinensis," that, though they are attracted by the smell, yet it is not to deposit their eggs, as in the *Stapeliæ*, but to partake of it as food.

At a little distance, the smell is so strong and fetid, that few persons will believe it to lose its offensive character, when held to the nose. I can, however, attest the truth of the following passage, extracted from WITHERING's Arrangement: "Such as have courage to smell this matter closely, will find it much less disagreeable than at a distance; for it then seems to have a slight pungency, like that of volatile salts." I am not conscious that the plant has been applied to any use, except to make poultices for rheumatism, by the good-wives of Holland,—probably very harmlessly.

The systematic relations of *Phallus* are very ambiguous, and no writer has completely satisfied me on the subject. My industrious and acute friend M. ADOLPHE BRONGNIART has not passed over this in his valuable "Essai d'une classification

naturelle des Champignons," in which he has placed *Phallus* at the end of the true *Fungi*. He observes of the tribe *Clathroideæ* (to which the genus belongs, " Aussi leur position est-elle encore restée incertaine, de sorte que quelques auteurs, tels que FRIES et LINK, les placent parmi les *Lycoperdacées;* tandis que d'autres, tels que PERSOON et NEES d'ESENBECK, les rangent parmi les champignons hyménothèques. Cette dernière opinion paroit la plus naturelle. En effet, la nature charnue et non filamenteuse de ces champignons, l'analogie du sac qui les renferme avant leur développement complet, avec la volva des *Amanita* plutôt qu' avec le péridium fibreux et sec des *Lycoperdacées;* enfin, la manière dont leurs sporules paroissent renfermées dans des sacs membraneux analoques aux thèques des vrais champignons, nous engagent à les placer auprès de ces derniers, plutôt qu' à la suite des *Lycoperdacées.*" From what is known of the *Clathroideæ*, I am inclined to adopt M. ADOLPHE BRONGNIART's opinion, even though I cannot agree that the membranaceous sacs containing the sporidia, to which he alludes, have been distinctly ascertained to exist. Could we indeed clearly find out how the sporidia are disposed, one great step would be gained. BULLIARD speaks of certain numerous and regular sinuous lines in the green substance of the pileus previous to the bursting of the volva, and of numerous little opaque seeds, arranged along the divisions, with intermediate spaces full of a mucilaginous fluid. A part of this may be readily enough seen, but the remainder is so vague, at least so it appeared to me, that I have declined attempting to figure what I could not clearly trace. At the same time, the view given by BULLIARD and M. ADOLPHE BRONGNIART is not improbable, and may hereafter be made the subject of a supplementary plate, should I ever be so fortunate as to satisfy myself respecting the details.

LINK, in the view he has taken of the affinities of *Phallus*, considers the volva as a *sporangium*, the stipes as a *columella*, and the pileus as a *capitulum*.

TAB. 213. Fig. 1. *A volva previous to bursting.* Fig. 2. *A volva recently burst; pieces of the inner volva adhering to the stipes; the green substance not yet begun to liquefy.* Fig. 3. *The full-sized fungus; the green substance having disappeared, and exposed the cells of the pileus;*—all natural size.

TAB. 214. Fig. 1. *A volva artificially opened, and the outer volva drawn aside, to shew the inner one enveloping the rest of the fungus.* Fig. 2. *A section of a volva, and its contents, shewing the pileus already fully formed, and the compressed cellules of the stipes, &c. &c.* Fig. 3. *A complete vertical section of a mature plant.* Fig. 4. *View of the summit of the pileus oftener closed than perforated;* natural size. Fig. 5. *Sporidia,* magnified.

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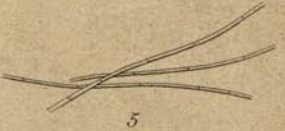

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SPHÆRIA CITRINA.

Yellow web-like Sphæria.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *HYPOXYLA, De Cand. Grev. Brongn.*

GENERIC CHARACTER.

Receptaculum 0. *Perithecia cornea, libera, sessiles aut subimmersa, nuda aut strato inferno filamentoso, sparsa vel congesta, ore interdum elongato, aliquando nullo; intus massa gelatinosa sporulifera instructa.*

Receptacle 0. Perithecia corneous, free, sessile, or somewhat immersed, naked, or with an inferior filamentous stratum, scattered or crowded, the mouth sometimes elongated, at others wanting. Interior filled with a gelatinous sporuliferous mass.

SPECIFIC CHARACTER.

SPHÆRIA citrina; *peritheciis globosis, subimmersis, ostiolis prominulis, convexis, strato (stroma?) filamentoso, effuso, inferne præcipue citrino.*

SPH. perithecia globose, subimmersed, the orifices prominent, convex, furnished with an effused filamentous stratum (stroma?) of a yellow colour, especially beneath.

SPHÆRIA citrina, *Pers. Obs. Mycol.* 1. p. 68.—*Syn. Fung.* p. 18.—*Alb. et Schwein.* p. 7.—*Fries, in Vet. Ac. Handl.* 1816, p. 141.—*Sclerom. Suec.* No. 31.—*Syst. Mycol.* v. 2. p. 387.

SPHÆRIA ochracea, *Pers. Syn.* p. 18.—*Schwein. Fung. Carol.* No. 32.

NÆMASPORA sulphurea, *Wahl. Fl. Ups.* p. 471.

HAB. On the ground, rotten wood, &c. Autumn and winter. Appin, Captain CARMICHAEL.

Web-like stratum 2–5 inches broad, byssoid at the margin, especially in young plants, attaching itself to every thing in its way, plane, but undulated by the subjacent substances, of a yellow or tawny yellow colour. Captain CARMICHAEL's specimens were tawny above, and very bright yellow beneath. *Perithecia* globose, pale yellow, with their upper portion, and slightly prominent convex fuscous orifices, exserted. In age the perithecia seem to fall out, and leave nothing but their cavities. *Thecæ* clavate, slender. *Sporidia* I have not seen.

Sphæria ochracea of PERSOON is of an ochraceous colour, and somewhat tuberculated surface. When growing on the ground, both varieties are thicker, and more carnose, than when they occur on wood.

This addition to the British Flora, I had the pleasure of receiving a few months ago from Captain CARMICHAEL. His specimens differ from the usual appearance, in only being of a duller colour on the exterior surface. No one but himself has had the good fortune to detect it in this country.

Fig. 1. *Plant,* natural size. Fig. 2. *A portion with perithecia.* Fig. 3. *A perithecium divided.* Fig. 4. *Thecæ.* Fig. 5. *Filaments of the stratum;* —magnified.

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POLYTHRINCIUM Trifolii.

Trefoil Polythrincium.

Class and Order CRYPTOGAMIA FUNGI.—Nat. Ord. *BYSSOIDEÆ, Grev.* —MUCEDINES, *Link.*

GENERIC CHARACTER.

Thallus e fibris cæspitosis, coloratis, erectis, simplicibus, multiseptatis. Sporidia didyma inspersa.

Thallus composed of coloured, erect, simple, tufted, jointed filaments. Sporidia 2-celled, scattered.

SPECIFIC CHARACTER.

Polythrincium Trifolii;.....

Polythrincium Trifolii, *Kunze, Mycol. Heft.* 1. p. 13. t. 1. f. 8.—*Deutschl. Schwæm.* Fasc. 5. p. 5. No. 121.

Hab. On the inferior surface of living leaves of several species of *Trifolium.* Autumn. About Edinburgh in October, not very rare.

To the naked eye, this little plant appears in the form of numerous minute black spots of unequal size. Under the microscope, these spots are each found to consist of a number of distinct little roundish *tufts* of filaments, nearly equidistant from one another, and becoming smaller towards the circumference. The *filaments* are densely crowded, semi-transparent, gradually thickening upwards, somewhat moniliform from the numerous articulations, erect, simple; the *sporidia* oval, 2-celled, scattered among the filaments.

The first notice of this new genus by Professor Kunze, is contained in the collection of dried specimens of "Fungi," published by him and M. Schmidt under the title of *Deutschlands Schwaemme,* in the 5th Part of which is a character and specimen of the plant. A more complete description, accompanied with a figure, was afterwards introduced into the first fasciculus of "Mykologische Hefte nebst einem allgemein-botanischen Anzeiger."

Professor Kunze observes, that the sporidia lie towards the base of the filaments, so that they may be easily overlooked;

and that this circumstance, taken in conjunction with their being found on the green leaf, may render the species liable to be mistaken for one of the *Entophytæ*, allied to *Phragmidium* of LINK, (*Aregma* of FRIES, and *Puccinia* of NEES.) He mentions, also, that several botanists had even sent it to him as the *Sphœria Trifolii* of PERSOON.

There can be no doubt that it ought to be placed among the persistent *Byssoideæ*, from every genus of which, its characters prove it to be abundantly distinct.

Fig. 1. *A leaf of Trifolium pratense, with P. Trifolii,* natural size. Fig. 2. *A small portion of a leaf, with plants.* Fig. 3. *Tufts removed.* Fig. 4. *Filaments and sporidia;*—magnified.

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AGARICUS RADICATUS,

Long-rooted Agaric.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *FUNGI, Link.*

SERIES I. LEUCOSPORUS.—TRIB. VIII. CLITOCYBE, *Fries.*

GENERIC CHARACTER.

Pileus stipitatus aut latere affixus, subtus lamellis sporuliferis, rectis, simplicibus. Volva nulla.

Pileus furnished with a stipes, or fixed by its side, having on the under surface straight, simple, sporuliferous lamellæ. Volva none.

SPECIFIC CHARACTER.

AGARICUS radicatus; *pileo rugoso, glutinoso, lamellis adfixis albidis; stipite procero, rigido, basi dilatato, radice longa fusiformi.*

AG. pileus rugose, glutinous, the lamellæ white, fixed; stipes tall, rigid, thickened towards the base, root long and fusiform.

AGARICUS radicatus, *Relh. Fl. Cant.* p. 529.—*With. Bot. Arr.* ed. 6. v. 4. p. 275.—*Sow. Fung* t. 48.—*Sibth. Fl. Oxon.* No. 973.—*Pers. Syn. Fung.* p. 313.—*Alb. et Schwein.* p. 165.—*Purt. Midl. Fl.* v. 2. p. 637.—*Fries, Syst.* v. 1. p. 118.—*Grev. Fl. Edin.* p. 378.—*Schwein. Fung. Carol.* No. 612.

AGARICUS longipes, *Bull. Champ.* t. 232. et 515.—*De Cand. Fl. Franç.* ed. 3. v. 2. p. 184.—*Ejusd. Syn.* p. 37.

AGARICUS macrorhizus, *Pers. Obs. Mycol.* 1. p. 47.

AGARICUS umbraculum, *Batsch.* fasc. 1, p. 77. f. 4.—*With. Bot. Arr.* v. 4. p. 209.

AGARICUS macrourus, *Scop. Fl. Carn.* p. 423.

HAB. Woods, borders of fields, road-sides, &c. generally near the rotting stumps of trees; not unfrequent. Summer and autumn. Foxhall, near Edinburgh. Woods at Balmuto, abundant.

Pileus convex-conical while young, at length nearly quite plane, obtusely umbonate, more or less rugose and somewhat glutinous, smooth, generally possessing considerable toughness and elasticity: in regard to colour, it is very irregular, being whitish, ash-colour, brown, smoke-grey, reddish, olivaceous, greenish, or even, according to SCHUMACHER, sometimes yellow! the most frequent is an olivaceous and greenish hue. *Flesh* very thin, white. *Lamellæ* rather distant, white, fixed, rather broad, entire, mostly 4 in a set. *Stipes* generally solid, rarely with a small spongy cavity, 4–8 inches high, firm, smooth, slightly twisted, pale fawn colour, or tinged with green, gradually tapering upwards.

Root fusiform, 4–12 inches in length or more, brownish, tough. *Sporidia* oval, large.

Among the few species of Agaric with fusiform roots, this is the most conspicuous; for that part frequently, indeed generally, exceeds in length the remainder of the plant. FRIES remarks, that, like *Monotropa*, the root terminates in an attachment to the trunks of trees beneath the surface, and I have every reason to believe him correct. Nor do I disagree with my observing friend Mr PURTON, who seems inclined to think the great length of this organ may be to a certain extent accidental; for the length undoubtedly depends upon the depth at which the fungus vegetates. Still, a singularly long root is one of the peculiar characters of this species, and I never could find a single specimen, even where it is most plentiful, which sprung from near the surface. Under all the variations of the pileus, therefore, and they are many, I believe the stipes and root will be found so constant to their characters, as to render the determination of the species a work of no difficulty.

The pileus is so tenacious, that, in some specimens, it may be folded betwixt the fingers without tearing.

Fig. 1. *A full-sized plant, with a root of ordinary length.* Fig. 2. *A pileus half-grown.* Fig. 3. *Part of a young plant.* Fig. 4. *Portion of a pileus divided;* natural size. Fig. 5. *Sporidia,* magnified.

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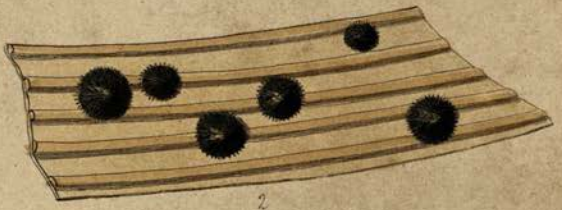

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ACTINOTHYRIUM Graminis.

Minute black Actinothyrium.

Class and Order CRYPTOGAMIA FUNGI, *Linn.*—Nat. Ord. *HYPOXYLA*, *De Cand.*

GENERIC CHARACTER.

Perithecium scutiforme, radiato-fibrosum, subtus lævе. Sporidia fusiformia.

Perithecium shield-shaped, composed of radiating fibres, smooth beneath. Sporidia fusiform.

SPECIFIC CHARACTER.

Actinothyrium Graminis;.....

Actinothyrium Graminis, *Kunze, Mykol. Hefte*, 2. p. 81. t. 2. f. 3.—*Deutschl. Schwaem.* No. 183.—*Fries, Sclerom. Suec.* No. 64.—*Moug. et Nestl. Stirp. Exsicc.* No. 657.—*Fries, Syst.* v. 2. p. 597.

Hab. On the leaves and culms of various grasses, in the spring, frequent. Common about Edinburgh. It has been obligingly communicated from England by W. C. Trevelyan, Esq.

To the naked eye, a clear, very black spot, about one-third of a line in breadth, is all the appearance made by this curious minute plant. The *spots* (perithecia) are irregularly gregarious, sometimes confluent. Under the microscope, the structure is obvious. The *perithecia* are orbicular, adnate with the body on which they grow, plane towards the margin, but thickening somewhat towards the centre, where they are obtusely umbonate. The outer surface is a mass of stout fibres radiating from the centre to the circumference, somewhat twisted and interlaced, except at the margin, where they are free, and terminate obtusely. The *under surface* of the perithecia is plane, even, and of a rather pale colour, the attachment chiefly in the centre. On making a vertical section, we find a considerable portion of the circumference to consist of nothing but a stratum of fibres; but towards the centre is a shallow cavity, filled with a gelatinous substance, composed entirely, or nearly so, of slender, curved, fusiform *sporidia*.

This singular little production, first published by Professor Kunze, seems to be more allied to *Leptostroma* than any other genus, and accordingly M. Fries has placed it between *Excipula* and that genus. I have never been able to ascer-

tain whether the perithecium is dehiscent, but, from its structure at the centre, am inclined to think that it is not,—a circumstance that would, as M. FRIES has already observed, bring it still nearer to *Leptostroma.*

The present plant, as well as *Polythrincium Trifolii*, are here introduced for the first time to the British Flora.

Fig. 1. *Plants,* natural size, *on a culm.* Fig. 2. *A portion of the culm, with plants.* Fig. 3. *A perithecium removed.* Fig. 4. *The same with the base exhibited.* Fig. 5. *A perithecium divided.* Fig. 6. *Another portion of a perithecium.* Figs. 7. & 8. *Sporidia;* magnified.

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LICHINA PYGMÆA.

Round-fruited Lichina.

CLASS AND ORDER CRYPTOGAMIA ALGÆ, *Linn.*—NAT. ORD. *ALGÆ, Juss.*

GENERIC CHARACTER.

Frons cartilaginea, dichotoma, angustissima, tuberculis terminalibus.

Frond cartilaginous, dichotomous, very narrow, with terminal tubercles.

SPECIFIC CHARACTER.

LICHINA pygmæa; *fronde plana, tuberculis globosis.*

L. frond plane, the tubercles globose.

LICHINA pygmæa, *Agardh, Sp. Alg.* p. 105.—*Syst.* p. 274.—*Hook. Fl. Scot.* p. 96. (var. *a.*)—*Grev. Fl. Edin.* p. 286.

GELIDUM pygmæum, *Lyngb. Hydroph. Dan.* p. 41. *in part.*

FUCUS pygmæus, *Lightf. Fl. Scot.* p. 964. t. 32.—*With. Bot. Arr.* ed. 6. v. 4. p. 118.—*Turn. Syn. Fuc.* v. 2. p. 258.—*Sm. Engl. Bot.* t. 1332.—*Turn. Hist. Fuc.* t. 204. f. *a,–h,* (var. *a.*)

FUCUS pumilus, *Huds. Fl. Angl.* p. 584.—*Esper, Ic. Fuc.* 2. p. 9. t. 116.

FUCUS lichenoides, *Good. & Woodw. Linn. Trans.* v. 3. p. 192.—*Hull. Fl.* p. 324.

LICHEN saxatilis maritimus muscosus minimus nigerrimus, *Mich. Nov. Pl. Gen.* p. 103.

HAB. Rocks in the sea below high-water mark, frequent; in Scotland most plentiful in the north. In England very abundant on the south-west coast. Perennial; producing perfect fructification in autumn.

Plant growing in a crowded manner, often entirely covering the rocks, of a very dark dull green colour when moist, quite black when dry. *Root* an irregularly dilated disk, very evident where the fronds are not densely crowded. *Fronds* cartilaginous, very numerous, forming somewhat spreading tufts, which becoming more and more confluent, press each other into a more erect position: they rarely exceed half an inch in length, are much compressed, or plane, repeatedly divided in an irregularly dichotomous manner, not half a line broad, towards the apex generally more or less palmated, the branches speading, the summits obtuse. *Fructification* subglobose tubercles terminating the fronds, or situated near the apex, often clustered together, of a dark dingy yellowish colour towards their pore-like orifice: they are filled with a fine gelatinous mass, which, when divided horizontally, exhibits the oval *seeds* or *sporules*, lying among dense filaments, and arranged in nearly continuous lines from the centre to the circumference. After the escape of this mass, the tubercles begin to decay, and, by the enlargement of the orifice and gradual disappearance of its margin, assume the form of the shields of some lichens.

That there are two species of this curious genus, is now, I believe, generally admitted; and, as the one under the name of *Fucus pygmæus*, and the other under that of *Lichen confinis*, are very imperfectly represented in "English Botany," I have not hesitated to introduce figures of them in the present work. My principal inducement, however, for so doing, is the power which recent examinations have afforded me, of delineating the seeds, and describing the nature of the fructification, which, to the best of my belief, has hitherto remained a desideratum.

It is not surprising that one of these plants should have been arranged with the *Lichens* by ACHARIUS and Sir JAMES EDWARD SMITH, considering they were unacquainted with the nature of the fruit; for, in regard to mode of growth, both to the naked eye and under the microscope, *Lichina confinis* seems to be equally allied to the *Lichens* and the *Algæ;* and, had not *Lichina pygmæa* been previously acknowledged as an *Alga*, *L. confinis* might perhaps have remained among the lichens until this day. The great affinity between both plants cannot, however, now escape the observation of the cryptogamist, independently of the fructification, as the advanced state of this department of botany requires more rigid investigation than was formerly necessary or practised. AGARDH has therefore placed them together under his genus *Lichina*, a name expressive of their lichenoid habit. That eminent algologist nevertheless, observes, in regard to the fructification, "Fructus nondum bene cognitus. Tubercula ut fructus *Ficus*, apice poro pertusa non aliis sporidiis detectis, quam fila minutissima moniliformia immersa."

In a recent journey into Devonshire, I collected, among other marine plants, specimens of *Lichina pygmæa*, in so perfect a state, that I was induced to examine the fructification with the aid of a microscope, and succeeded in observing the seeds in the first tubercle I opened. This, I apprehend, was partly owing to the circumstance of my having taken a thin horizontal slice, which I subsequently found always successful. The seeds of *Lichina confinis* were in the same mode of dissection equally obvious. Thus it is that chance frequently assists the investigations of the naturalist.

It is worthy of remark, that *L. confinis* is always situated nearer high-water mark than *L. pygmæa;* the latter I have frequently found covered at mid-tide.

Fig. 1. *Usual size of L. pygmæa.* Fig. 2. *Large specimen gathered in Devonshire;* natural size. Fig. 3. *A single plant.* Fig. 4. *Tubercle.* Fig. 5. *Tubercle divided.* Fig. 6. *Old tubercle having lost its contents.* Fig. 7. *Portion of a horizontal slice, as seen through the microscope.* Fig. 8. *Appearance of the filaments in which the seeds are imbedded.* Fig. 9. *Seeds;* magnified.

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BANGIA CALOPHYLLA.

Carmichael's Bangia.

CLASS AND ORDER CRYPTOGAMIA ALGÆ, *Linn.*—NAT. ORD. *ALGÆ, Juss.*

GENERIC CHARACTER.

Frons flexilis nuda, continua, membranacea, capillaris vel in membranam dilatata, intus fasciis granulorum notata.

Frond not rigid, naked, continuous, membranaceous, capillary or dilated into a membrane, marked by bands of internal granules.

SPECIFIC CHARACTER.

BANGIA calophylla; *frondibus viridibus, cæspitosis, minutis, intricatis, lineis longitudinalibus granulorum* 1—12*-notatis, granulis quadri-partitis.*

B. fronds green, tufted, minute, entangled, marked with 1–12 longitudinal lines of granules, the granules quadripartite.

BANGIA calophylla, *Carm.* MSS.

HAB. On a block of stone near the Clergyman's house in the Island of Lismore. October. Captain CARMICHAEL.

Plant minutely tufted, forming a green velvety surface on the stone. *Fronds* bright green, pellucid, 2–3 lines in length, plane, linear, attenuated at the base, conspicuously dotted with granules, which form longitudinal lines rather than regular transverse bands: they are often curiously curled and twisted, and vary so greatly in breadth, that, in some, there is only a single line of granules, in others as many as twelve. Each *granule* is of a darker green than the rest of the frond, and of a square form, which, under a good glass, is perceptibly divided into four parts by pellucid lines; or, perhaps, it might be more correct to say, that each granule is composed of four smaller ones.

Captain CARMICHAEL, the discoverer of the present highly beautiful alga, correctly notices how nearly it is allied to *Bangia velutina*, of AGARDH's Systema Algarum (*Scytosiphon velutinus*, LYNGB. t. 16.) At the same time, I entirely agree with him that they are specifically different. *Bangia velutina* is an aquatic plant, an inch in length, and the fronds marked by a single or double series of quadripartite granules: *B. calophylla*, on the other hand, is not aquatic, only 2–3 lines in

length, and the fronds often bearing 10 or 12 series of quadripartite granules. LYNGBYE, besides, describes the fronds of his plant as terete, and as sometimes, though rarely, becoming dilated into an Ulva-like membrane; but in *B. calophylla*, the fronds are all plane, and, though differing in relative breadth, yet in each individual are nearly equal throughout its whole length, except towards the base, where they are all rather gradually attenuated. In other respects, the two species greatly resemble each other.

In regard to these species, my acute friend has also observed, that their structure seems to indicate an affinity with the *Ulvaceæ*, rather than the *Confervoideæ*. In this I not only coincide, but am of opinion that the whole genus is in the same predicament. In the irregularity of the diameter of the frond alone, all the species, except one, deviate greatly from the *Confervoideæ*. In *Bangia velutina*, *torta*, *crispa*, *atro-purpurea*, and *calophylla*, we find a variation in breadth, similar to that which occurs in *Solenia compressa*, AG. (*Ulva compressa*, L.), *B. Laminariæ* alone is wanting in this character. But even without excluding the latter plant, I do not perceive, that, if the genus *Bangia* was at once removed to the *Ulvaceæ*, any violence would be done to the character of that tribe, as detailed in the recent and excellent work by AGARDH on the Algæ; whereas the character there given of the *Confervoideæ* scarcely applies to any one species of *Bangia*; for the granules cannot surely be termed a mode of internal articulation, when more than one series occur in the same frond. I cannot even avoid suspecting, that all the species will prove to have plane fronds, except perhaps *B. Laminariæ*, a plant which I dare not speak of with any certainty.

Fig. 1. *B. calophylla spreading over a stone*, natural size. Fig. 2. *Tufts removed.* Fig. 3. *A tuft shewing variously shaped fronds.* Fig. 4. *Portion of a frond.* Fig. 5. *Ditto, with the granules more closely arranged.* Fig. 6. *Ditto, with another appearance of the granules;*—magnified.

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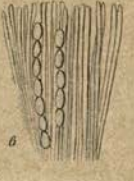

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LICHINA CONFINIS,

Oval-fruited Lichina.

CLASS AND ORDER CRYPTOGAMIA ALGÆ, *Linn.*—NAT. ORD. *ALGÆ, Juss.*

GENERIC CHARACTER.

Frons cartilaginea, dichotoma, angustissima, tuberculis terminalibus.

Frond cartilaginous, dichotomous, with terminal tubercles.

SPECIFIC CHARACTER.

LICHINA confinis; *fronde cylindrica, tuberculis ovalibus.*

L. frond cylindrical, the tubercles oval.

LICHINA confinis, *Ag. Sp. Alg.* p. 105.—*Syst. Alg.* p. 274.—*Grev. Fl. Edin.* p. 286.

LICHINA pygmæa β, minor, *Hook. Fl. Scot.* 2. p. 96.

FUCUS pygmæus β, minor, *Turn. Hist. Fuc.* t. 204. f. *i–o.*

LICHEN confinis, *Ach. Prodr. Lich.* f. 208.—*Fl. Dan.* t. 879. f. 2.—*Smith, Engl. Bot.* t. 2575.

STEREOCAULON confine, *Ach. Meth. Lich.* 2. p. 317.

HAB. Rocks on the sea-coast, near high-water mark. Rocks opposite Caroline Park near Edinburgh, at Dunbar, and many other places in Scotland:—more rare in England. Perfect fructification produced in autumn.

Plant growing in a crowded and concentrical manner, spreading widely over the rocks like a lichen, very dark green when moist, black when dry, very short, rarely exceeding 2–3 lines. *Root* an irregular disk, of a pale yellowish-green colour, as is also the base of the stems of the frond. *Fronds* numerous, crowded, cylindrical, various in length; some are given off from the disk-like root, almost in a creeping manner; the remainder are erect, variously divided, and obtuse at the apex, or terminating in oval tubercles. *Tubercles* somewhat paler at the pore-shaped orifice, filled with a gelatinous mass of filaments, among which the oval seeds are arranged in continuous lines, from the centre to the circumference, as in *L. pygmæa.* After the contents of the tubercle have escaped, the orifice enlarges, as in *L. pygmæa*, and at length becomes a mere concave empty receptacle.

This minute species seems to be less general than the one figured in the preceding number of this work, and it is perhaps

owing to this circumstance that it has received less attention than it deserves. As one of the points by which the two great groups of *Algæ* and *Lichenes* approach each other, and even seem to come into actual contact, it alone possesses great interest; but it is besides very distinct as an individual. From the only other known species, *L. pygmæa*, it is separated, not only by its invariably many times smaller size, but by its cylindrical (never plane) fronds, and longer tubercles: the branches, moreover, are not so uniformly divaricate as in *L. pygmæa*, and never palmate. Except in the form of the tubercle, the fructification is in every respect similar; but it is more difficult to examine, on account of the extreme minuteness of the part. The mode of growth of this species very much resembles that of many lichens, for the centre of the tuft dies away, leaving the circumference entire, which continues to enlarge itself in a concentrical manner. At the distance of a few feet, it cannot be distinguished from a *Collema*.

Fig. 1. *L. confinis*, natural size, *on a piece of rock*. Fig. 2. *A plant*. Fig. 3. *A tubercle*. Fig. 4. *A tubercle vertically divided*. Fig. 5. *A thin horizontal slice from the tubercle*. Fig. 6. *Filaments and seeds*. Fig. 7. *Seeds*:— magnified.

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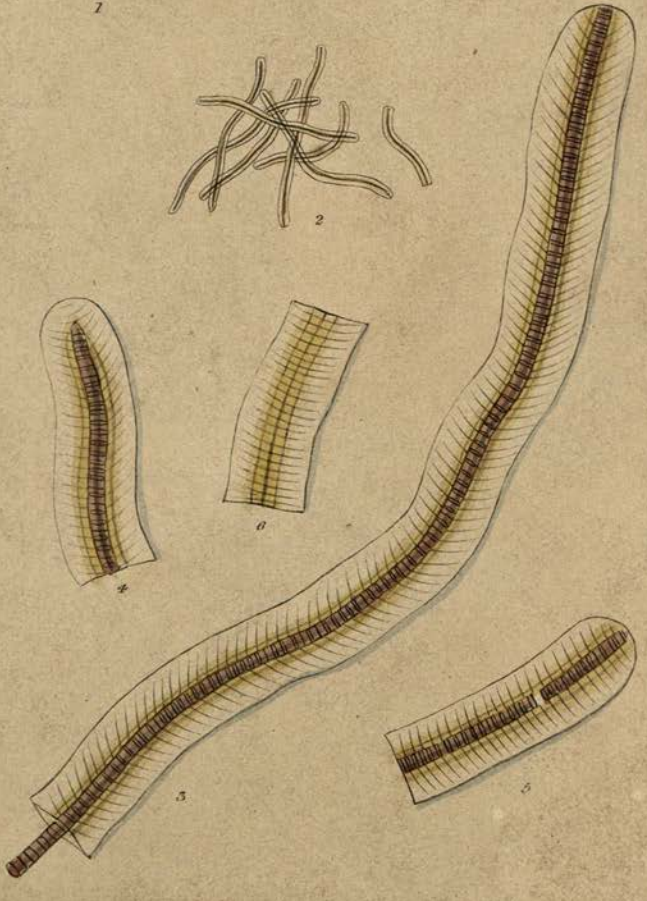

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OSCILLATORIA ALATA.

Winged Oscillatoria.

CLASS AND ORDER CRYPTOGAMIA ALGÆ, *Linn.*—NAT. ORD. *ALGÆ, Juss.*

GENERIC CHARACTER.

Fila muco communi matricali involuta, rigida, elastica, oscillantia, striis parallelis transversis secta.—AGARDH.

Filaments invested by a common mucous matrix, rigid, elastic, oscillating, divided by parallel transverse stria.

SPECIFIC CHARACTER.

OSCILLATORIA? alata; *stratum rufo-fuscum, filis brunneis, minutis, late alatis, alis albidis, filamenta versus lutescentibus.*

O.? stratum reddish-brown, filaments brown, minute, broadly winged, wings whitish, becoming yellow towards the filament.

OSCILLATORIA alata, *Carm.* MSS.

HAB. Appin, on rocks exposed to the trickling of water, Captain CARMICHAEL, 1825.

Plant covering moist rocks, in the form of a thin brown stratum, by itself, or mixed with a minute *Nostoc*. *Filaments* minute, a few lines only in length, winged, obtuse, with numerous stria; when taken in conjunction with the wings or membranous expansions, they are linear, and plane. Each wing is about thrice the breadth of the proper filament, of a white colour, somewhat transparent, of a bright yellow next the filament, and exhibiting, under a favourable light of the microscope, a numerous series of transverse lines or rugæ.

Along with *Bangia calophylla*, represented in the last Number, I had also the pleasure of receiving this singular production from my friend Captain CARMICHAEL. It is one of those marvellous, ambiguous objects, that serve to confound the Naturalist,—Philosopher,—call him what we will,—and to humble him, would he only acknowledge it, in his own estimation. Many of these perplexing bodies are beautiful, and beyond the power of the artist to delineate faithfully, their hues are so various, and so delicately blended.

In regard to the present object, being an *Oscillatoria*, Captain CARMICHAEL has observed to me, that he could not perceive it either radiate or oscillate; yet he is of opinion that it belongs to the *Oscillatoriæ veræ* of AGARDH's Systema Algarum. While I am unable to disprove this, I cannot unhesitatingly agree to it, greatly as I rely on Captain CARMICHAEL's opinions. The jointed filament, I conceive, might serve as the intestinal canal, while the two wings might form the body, of a minute animal,—a supposition which the transverse rugæ of the wings rather contribute to confirm; but farther I cannot go, and have willingly given it a place in this work, in the hope that more attention may be ultimately conferred upon this interesting subject..

Fig. 1, 1. *Plants,* natural size. Fig. 2. *A few filaments.* Fig. 3. *Usual appearance of the filaments.* Fig. 4. *Occasional termination of the filaments.* Fig. 5. *A portion of another filament.* Fig. 6. *Ditto, ditto;*—more or less magnified.

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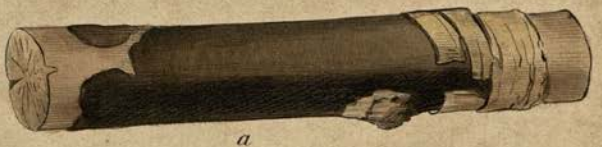

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STROMATOSPHÆRIA UNDULATA.

Uneven Stromatosphæria.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *HYPOXYLA, De Cand.*

GENERIC CHARACTER.

Receptaculum varium, sessile, liberum vel erumpens. Perithecia omnino latentia vel ore exserto; intus massa gelatinosa sporidifera instructa.

Receptacle various, sessile, free, or bursting through the bark. Perithecia concealed, or furnished with a prominent orifice; filled with a gelatinous sporuliferous mass.

SPECIFIC CHARACTER.

STROMATOSPHÆRIA undulata; *effusa, interrupta, undulata, atra, intus alba, ostiolis subrotundis prominulis.*—FRIES.

St. effused, interrupted, undulate, black, white within, the orifices of the perithecia roundish, prominent.

STROMATOSPHÆRIA undulata, *Grev. Fl. Edin.* p. 356.

SPHÆRIA undulata, *Pers. Syn. Fung.* p. 21.—*Alb. et Schwein.* p. 9.—*De Cand. Fl. Franç.* v. 6. p. 120.—*Moug. et Nestl. St. Exsicc.* No. 371.—*Hook. Fl. Scot.* Pt. 2. p. 5.—*Schwein. Fung. Carol,* No. 40.—*Fries, Syst. Mycol.* v. 2. p. 350.

HAB. On the dead branches of various trees, at all seasons, not very rare. About Edinburgh, occasionally.

Receptacle effused, spreading for 2 inches or more in an undulate, interrupted manner, on the denuded wood, or even on the bark of the branches of trees: near 2 lines thick, dull black, whitish within, of a corneous substance. *Perithecia* numerous, with roundish, prominent orifices. *Thecæ* very slender, containing about 6 linear-oblong *sporidia.*

This species is distinguished from the following, by being shorter, thicker, the surface much more broken and uneven, and by the orifices of the perithecia being roundish and much more prominent, even to the naked eye. It is also of much less frequent occurrence.

Fig. 1. a, *Plant,* natural size. b, *A portion of the receptacle.* c, *Thecæ and Sporidia;* magnified.

STROMATOSPHÆRIA STIGMA.

Smooth spreading Stromatosphæria.

SPECIFIC CHARACTER.

STROMATOSPHÆRIA stigma; *ambiente effusa, applanata, lævis, demum nigra, ostiolis subimmersis, planiusculis.*—FRIES.

St. effused in an ambient manner, plane, smooth, at length black, orifices of the perithecia somewhat sunk, nearly plane.

STROMATOSPHÆRIA stigma, *Grev. Fl. Edin.* p. 356.

STROMATOSPHÆRIA decorticata, *Grev.* l. c. p. 357.

SPHÆRIA stigma, *Hoffm. Veg. Cr.* 1. p. 7. t. 2. f. 2.—*Pers. Syn. Fung.* p. 21.—*Alb. et Schwein.* p. 9.—*De Cand. Fl. Franç.* v. 2. p. 289.—*Ejusd. Syn.* p. 60.—*With. Bot. Arr.* ed. 6. v. 4. p. 470.—*Ehrh. Cr.* No. 170.—*Schleich.* No. 70.—*Nees, Syst.* t. 41. f. 319.—*Moug. et Nestl. St. Exsicc.* No. 372.—*Fries, Scler. Suec.* No. 46.—*Hook. Fl. Scot.* Pt. 2. p. 5.—*Schwein. Fung. Carol.* No. 41.

SPHÆRIA stigma, β decorticata, *Pers. Syn.* p. 21.

SPHÆRIA decorticata, *Sow. Engl. Fung.* t. 137. *excl. syn. (very bad.)*—*De Cand.* l. c. p. 289.—*Syn.* p. 60.—*Purt. Midl. Fl.* v. 2. p. 710.—*Winch, Bot. Guide,* 2. p. 108.

SPHÆRIA decorticans, *Sow. Fung. sub Sph. Kirbii,* t. 371.—*Pers. apud Moug. et Nestl.* l. c. No. 373.—*Purt. Midl. Fl.* v. 3. p. 491.

SPHÆRIA cinerea, *Sow. Fung.* t. 373. f. 11.

HYPOXYLON operculatum, *Bull. Champ.* p. 177. t. 468. f. 2.

LICHEN-AGARICUS obscurus, in arborum corticibus, &c. *Mich. Nov. Pl. Gen.* p. 105. No. 7. t. 55. f. 2.

HAB. On the dead branches of various trees, extremely plentiful, at all seasons.

Plant originating between the inner and outer bark of the dead branches of trees, and gradually occasioning the latter to fall off: spreading widely in all directions, often completely encasing the branch, less than a line in thickness, even, continuous, pale or reddish when young, becoming ultimately a brownish-black, and a good deal cracked, paler within. *Perithecia* very numerous, subglobose, the orifices flattish, or somewhat convex and slightly prominent, generally surrounded by a small depression of a somewhat paler colour than the rest of the receptacle. *Thecæ* minute, very slender. *Sporidia* subglobose.

None of our *Sphæriæ* occur in greater profusion than this species. It is of rapid growth, and is often seen to cover sticks three or four feet long, with a dark, smooth-looking coat. Though I formerly considered *St. stigma* distinct from *St. decorticans*, I have found reason to agree with FRIES, who has united them; the chief difference between the two, being a thicker substance, and rather more prominent orifice, in the variety *decorticans*.

Fig. 2. a, *Plant*, natural size. b, *A portion removed.* c, *Another portion, showing a variety in the appearance of the orifice.* c, *Thecæ and Sporidia;* —magnified.

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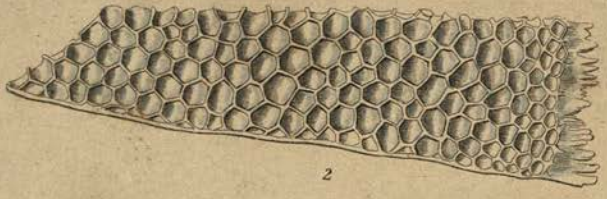

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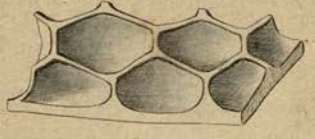

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POLYPORUS CARMICHAELIANUS.

Minute honey-combed Polyporus.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *FUNGI, Link.*

GENERIC CHARACTER.

Hymenium cum pilei substantia homogeneum et concretum, poris dissepimentis tenuibus simplicibus instructum.—Pileus subcarnosus vel suberosus, plerumque subsessilis, substantia fibrosa, sicca.

Hymenium of the same substance as the pileus, not separating from it, and furnished with pores, connected by simple dissepiments.—Pileus subcarnose or corky, mostly subsessile; substance fibrous and dry.

SPECIFIC CHARACTER.

POLYPORUS Carmichaelianus; *effusus, omninò resupinatus, tenuissimus, albus, margine membranaceo laciniato, poris minutis, subhexagonis, brevissimis.*

P. effused, entirely resupinate, very thin, white, the margin membranaceous, laciniated, the pores minute, subhexagonal, very short.

HAB. Decaying trunks and branches of trees; Appin, Captain CARMICHAEL.

Entire *plant* resupinate, smooth, so thin as to be almost like a membrane, of no regular form, effused, of a pure white colour, changing when dry to a pinkish-brown, the margin membranaceous, and between byssoid and laciniate. My specimen is 2–3 inches in breadth. *Pores* occupying almost the whole substance of the plant, very shallow, minute, more resembling somewhat hexagonal little pits or cavities than real pores, the dissepiments very thin. *Sporidia* very minute, globose.

I feel rather at a loss where to place this very pretty species,—whether in the tribe *Resupinatus*, or the sub-genus *Polysticta* of FRIES's System. The pores are by no means distant, but, on the contrary, their dissepiments are remarkably thin, and the whole hymenium partakes in miniature of the character of the first sub-genus *Favolus;* all which seems to remove the species from the sub-genus *Polysticta.* And the extreme shallowness of the pores, which do not at all resemble tubes, equally exclude it from the *resupinate* tribe. The pores

are irregular in size and form, but are mostly hexagonal, not oblique, and often little more than a mere reticulation.

My friend Captain CARMICHAEL had attached to the specimen he kindly sent me the name of *reticulatus* of FRIES. I have presumed to differ from him, as the pores scarcely agree with the character, and the colour changes in the dried specimens to a brown. I certainly consider it as an undescribed species.

Fig. 1. *Pol. Carmichaelianus,* natural size. Fig. 2. *A portion removed.* Fig. 3. *A smaller portion.* Fig. 4. *Filaments of which the plant is composed, and Sporidia;*—magnified.

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THELEPHORA SANGUINOLENTA.

Silky Thelephora.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *FUNGI, Link.*

GENERIC CHARACTER.

Hymenium cum pileo homogeneum et concretum, papillosum vel planum, setosum vel glabrum, undique fructificatione obsitum.—Pileus persistens, coriaceus, plerumque adnatus vel resupinatus.

Hymenium of the same substance, and not distinct from the pileus, papillose or plane, minutely bristly or smooth, everywhere covered with the fructification.—Pileus persistent or coriaceous, mostly adnate or resupinate.

SPECIFIC CHARACTER.

THELEPHORA sanguinolenta; *dimidiata effusaque, ad tactum cruentata, tenuis, sericea, pallida, subtus glabra griseo-fusca.*

T. dimidiate and effused, changing to a blood-colour when injured, thin, silky, pale, glabrous, and brownish-grey beneath.

THELEPHORA sanguinolenta, *Alb. et Schwein.* p. 274.—*Fries, Syst. Mycol.* v. 1. p. 440.—*Schwein. Fung. Carol.* No. 1013.—*Grev. Fl. Edin.* p. 409.

THELEPHORA sericea, var. β sanguinolenta, *Pers. Mycol.* 1. p. 117.

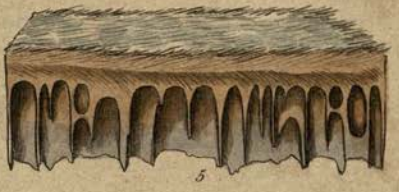
HAB. On the dead trunks of Fir-trees, not rare. Appin, Captain CARMICHAEL. About Edinburgh, frequent. Autumn to spring.

Plants 1–2 inches broad or more, thin, confluent, margins either becoming united, or imbricated, mostly quite adnate, rarely dimidiate, closely following the inequalities of the bark. *Hymenium* silky, somewhat glossy, covered with very minute adpressed hairs, indistinctly zoned with circular ridges, very pale, and slightly tinged with an ochry, brownish, or faint purplish hue, when scratched or wounded changing to a blood-red colour. The margin is paler, and finely byssoid, especially in young plants. *Inferior* or *dorsal surface* glabrous, pale, or brownish-grey; when dimidiate somewhat zoned. *Sporidia* globose, minute.

There is some uncertainty regarding this species, which I am not myself able to remove. It was originally established by ALBERTINI and SCHWEINITZ, and adopted by FRIES in his excellent System. PERSOON, however, in his Mycologia,

considers it as only a variety of SCHRADER's *Th. sericea*, which is the same as his own *Th. nitida*. FRIES, on the other hand, regards *Th. sericea* and *nitida* as a variety of his *Th. ochroleuca*, under which he quotes *Auricularia papyrina* of BULL. Champ. t. 402., and SOW. Fung. t. 349. If FRIES is correct in these references (and I have no reason to doubt his being so), he is certainly right in keeping *Th. sericea* apart from *sanguinolenta*. In consequence of not possessing authentic specimens from FRIES or PERSOON of these plants, I cannot venture to give any decided opinion, as all the species named are allied to each other.

Fig. 1. *Th. sanguinolenta.* Fig. 2. *A portion removed,* natural size. Fig. 3. *A small portion enlarged.* Fig. 4. *Thecæ and sporidia.* Fig. 5. *Filaments from the margin;*—more or less magnified.



POLYPORUS ABIETINUS.

Pale Violet Polyporus.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *FUNGI, Link.*

GENERIC CHARACTER.

Hymenium cum pilei substantia homogeneum et concretum, poris dissepimentis tenuibus simplicibus instructum.—Pileus subcarnosus vel suberosus, plerumque subsessilis, substantia fibrosa sicca.

Hymenium of the same substance as the pileus, not separating from it, and furnished with pores connected by simple dissepiments.—Pileus subcarnose or corky, mostly subsessile; substance fibrous and dry.

SPECIFIC CHARACTER.

POLYPORUS abietinus; *pileo resupinato, demum reflexo, tenui, coriaceo, villoso, albido, obscure zonato, poris irregulariter sinuato-dentatis, subviolaceis.*

P. pileus resupinate, at length reflexed, thin, coriaceous, villose, white, obscurely zoned, the pores irregularly sinuato-dentate, somewhat of a violet colour.

POLYPORUS abietinus, *Fries, Syst. Mycol.* v. 1. p. 370.—*Hook. Fl. Lond. (New Series)*, t. 180.—*Grev. Fl. Edin.* p. 402.

BOLETUS abietinus, *Dicks. Crypt. Brit.* fasc. 3. t. 9. f. 9.—*Pers. Obs. Mycol.* v. 1. p. 24.—*Syn. Fung.* p. 541.—*Alb. et Schwein.* p. 254.—*With. Bot. Arr.* ed. 6. v. 4. p. 396.—*De Cand. Fl. Franç.* v. 6. p. 40.—*Purt. Midl. Fl.* v. 3. p. 242. t. 13.—*Winch, Bot. Guide*, v. 2. p. 97.—*Schwein. Fung. Carol.* No. 917.

BOLETUS purpurascens, *Pers. Obs. Mycol.* fasc. 1. p. 24.

BOLETUS purpurascens, *De Cand. Fl. Franç.* v. 6. p. 41. *(non Persoon).*

BOLETUS decipiens, *Liljebl. (fid. Fries.)*

BOLETUS incarnatus, *Schum. Sæll.* p. 391.—*Hornem. Fl. Dan.* t. 1298.

AGARICUS decipiens, *Willd. Bot. Mag.* 4. p. 12. t. 2. f. 5.

HYDNUM parasiticum, *Linn. Sp. Pl.* 1648.—*Pentagn. Bot.* v. 5. p. 2124.

HYDNUM decipiens, *Schrad. Spic.* p. 180.—*De Cand. Fl. Franç.* v. 2. p. 112.—*Ejusd. Syn.* p. 23.

SISTOTREMA violaceum, *Pers. Syn. Fung.* p. 551.

HAB. On the dead trunks of Fir trees, from Spring to Autumn; very frequent, both in Scotland and England.

Plants often growing in so crowded a manner as to cover a considerable extent of surface. *Pileus* circular, entire, or somewhat lobed, about two inches in breadth, thin, coriaceous, resupinate at first, at length sometimes reflexed and undulate at the margin, villose, whitish, more or less impressed with obscure narrow zones. *Hymenium* at first of a pale violet colour, becoming brownish in the centre. *Pores* while young round-

ish, entire, short, quickly assuming an irregular lacerate and sinuous form. *Sporidia* minute, pellucid, white.

In the Flora Londinensis carried on by my friend Professor HOOKER, I have made some observations on this plant, which, as I have found no reason to alter, I shall in part transcribe from that magnificent work: "The great change of form which the pores of this species undergo in the course of a short period, added to a slight variation in the pileus, has given rise to much uncertainty respecting its genus; a striking proof of this fact is, that PERSOON has described it in his Synopsis Fungorum both as a *Boletus* and a *Sistotrema*.

"Under the specific name of *decipiens*, it has been alternately referred to *Agaricus*, *Hydnum*, and *Boletus*. DE CANDOLLE, in the 2d volume of the Flore Française, has given it to the public as a *Hydnum;* and in the Supplement, or 6th volume, describes it a second time as *Boletus abietinus*, to which he correctly adds *Boletus purpurascens* of PERSOON as a synonym. It is, however, not a little singular, and illustrative of the Proteus character of the pores of this plant, that, in the species immediately following, considered new, and named by him *purpurascens*, he should describe our species a third time, and so minutely and accurately, that no doubt can be entertained upon the subject."

The first commencement of this beautiful species is a minute plane tuft of radiating silky filaments, which begins to shew a few central, roundish, entire pores, while scarcely a quarter of an inch in breadth: in maturity, the pores become torn and toothed in every direction, and often entirely lose the character of a *Polyporus*, except at the extreme margin, where they commonly preserve their generic character.

In decay, the white of the pileus becomes tinged with green, the whole plant dries up, and the pores quite lose their violet colour.

Fig. 1. *Plants of P. abietinus, both resupinate and beginning to be reflexed.* Fig. 2. *A very young plant.* Fig. 3. *A portion of a pileus;* natural size. Fig. 4. *A portion of a mature plant.* Fig. 5. *A portion vertically divided;* more or less magnified.—*By an oversight, the Sporidia have had no number of reference attached to them.*

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STICTIS RADIATA.

Radiate Stictis.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *FUNGI, Link.*

GENERIC CHARACTER.

Receptaculum cupuliforme immersum, limbo vel margine conspicuo vel obliterato. Hymenium lœve, orbiculatum vel ellipticum receptaculo immersum.

Receptacle cupuliform, sunk, the limb or margin conspicuous or obsolete. Hymenium smooth, orbicular, or elliptical, immersed in the receptacle.

SPECIFIC CHARACTER.

STICTIS radiata; *valde immersa, orbicularis, limbo niveo lacerato vel integro, subpulverulento.*

S. deeply sunk, orbicular, the limb pure white, lacerate or entire, somewhat pulverulent.

STICTIS radiata, *Pers. Obs. Mycol.* 2. p. 73.—*Mycol. Europ.* v. 1. p. 336.—*De Cand. Fl. Franç.* v. 2. p. 270.—*Ejusd. Synops.* p. 56.—*Fries, Syst. Mycol.* v. 2. p. 194.

PEZIZA stictis radiata, *Pers. Syn. Fung.* p. 674.—*Alb. et Schwein.* p. 346.

PEZIZA æcidioides, *Nees, Syst.* p. 66. t. 37. f. 294.

PEZIZA marginata, *Relh. Fl. Cantab.* ed. 3. p. 556.—*With. Bot. Arr.* ed. 6. v. 4. p. 419.—*Sow. Fung.* t. 16.—*Winch, Bot. Guide,* v. 2. p. 101.

LICHEN excavatus, *Hoffm. Enum. Lich.* p. 47. t. 7. f. 4.

SPHÆROBOLUS rosaceus, *Tode, Fung.* 1. p. 44. t. 7. f. 58.

LYCOPERDON radiatum, *Linn. Sp. Pl.* v. 4. p. 624.

HAB. On the wood and branches of trees, or even on the dead stalks of large herbaceous plants; Autumn to Spring. Appin, Captain CARMICHAEL. It has been found occasionally in England by Mr RELHAN and Mr SOWERBY; and more recently in Oxfordshire, by Mr BAXTER, the intelligent Curator of the Botanic Garden at Oxford.

Gregarious. *Receptacle* imbedded in the substance of the wood or bark on which it grows, with the summit exserted, at first closed and punctiform, at length opening, and becoming urceolate, furnished with a marginal, spreading, broad, entire, or many-cleft limb, of a snow-white colour, and pulverulent surface. Sometimes the limb is nearly obsolete, and the margin is then short, erect, and irregular. *Hymenium* even, smooth, immersed in the receptacle, varying in colour from pale orange to yellow or white. *Sporidia* minute, globose. The whole plant varies in diameter from that of a pin's head to little more than half that size.

The genus *Stictis*, originally formed by PERSOON in his Observationes Mycologicæ, upon three species, one of which does not belong to it, contains at present, according to FRIES, twenty species. The last-mentioned author has divided them into three groups, according as the hymenium is persistent and gelatinous, or elliptical and deliquescing, or irregular in form, and becoming powdery:

1. CORTICIA. Hymenium subliberum, erumpens, gelatinosum, persistens.
2. XYLOGRAPHA. Hymenium ellipticum, deliquescens.
3. PROPOLIS. Hymenium variæ figuræ, in pulverem fatiscens.

The subject of the present description is known to be more variable than any of the rest, not only in the general size, but in the character of the marginal limb, and colour of the hymenium. The limb, however, is always white, when it is present, and pulverulent; and the colour of the hymenium varies only from pale orange to white. Judging from figures and descriptions, the limb seems to be quite as often entire as cleft into radiating segments: for my own part, I have not seen it otherwise.

Fig. 1. *Stictis radiata, on stems of Pteris aquilina,* natural size. Fig. 2. *A group of plants.* Fig. 3. *Plants destitute of the spreading limb.* Fig. 4. *Section of a plant.* Fig. 5. *Thecæ and sporidia;*—magnified.

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HIMANTIA CANDIDA.

Common White Himantia.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *MUCEDINES, Link.*—BYSSOIDEÆ, *Grev.*

GENERIC CHARACTER.

Flocci repentes divergenti-ramosi, laxe contexti. Sporidia libera, parca.

Filaments creeping, branched in a diverging manner, laxly connected. Sporidia free, few in number.

SPECIFIC CHARACTER.

HIMANTIA candida; *plerumque epiphylla, candida, fasciculis floccorum primariorum, apice dilatatis plumosis.*

H. mostly epiphyllous, pure white, the primary bundles of filaments dilated and plumose at their extremities.

HIMANTIA candida, *Pers. Syn. Fung.* p. 704.—*Alb. et Schwein.* p. 373.—*Nees, Syst.* t. 5. f. 72.—*Schwein. Fung. Carol.* No. 1365.—*Hook. Fl. Scot.* 2. p. 35.—*Grev. Fl. Edin.* p. 470.

HIMANTIA plumosa, *Pers. Mycol. Europ.* 1. p. 90.

BYSSOCLADIUM candidum, *Link, Berl. Mag.* v. 7. p. 36.

FIBRILLARIA stellata, *Sow. Fung.* t. 387. f. 1.

BYSSUS candida, *Huds. Fl. Angl.* p. 607.—*With. Bot. Arr. (in part.)*—*Relh. Fl. Cant.* ed. 3. p. 507.—*Lightf. Fl. Scot.* p. 1003.—*Purt. Midl. Fl.* v. 2. p. 609.—*De Cand. Fl. Franç.* ed. 3. v. 2. p. 66.—*Ejusd. Syn.* p. 13.

BYSSUS tenerrima villosa et elegantissime ramulosa, *Ray, Syn.* p. 476. t. 23.—*Dill. Sp. Musc.* p. 7. t. 1. f. 15.

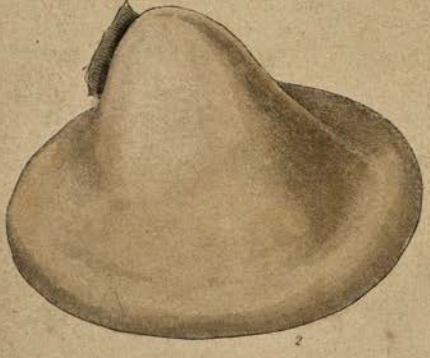
HAB. On decaying leaves and sticks in damp places, extremely common at all seasons.

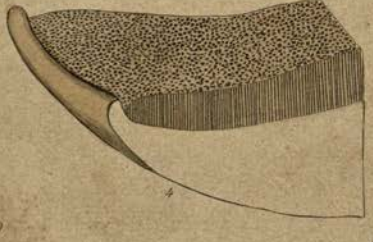
Plant from one to two inches or more in breadth, appressed, creeping, of a beautiful byssus-like aspect, and snow-white colour. The *filaments* are uniform, very minute, and irregularly bundled together, so that there appear to be many principal stems diverging from a centre, but which are in reality only a great number of the filaments laxly connected together: these bundles give off smaller ones, in a diverging but otherwise in no regular manner, and the whole become more and more dilated and feathery towards their extremities. Minute oval or oblong *sporidia* appear to be sparingly scattered among the filaments.

Most authors who have described the genus *Himantia*, have expressed their opinion that several of the species might eventually prove to be imperfect states of other plants. Many of them have evidently a near relation to the genus *Thelephora;* so much so, indeed, that M. ADOLPHE BRONGNIART observes it to be very difficult to say whether the genus *Athelia* of PERSOON should be placed along with *Himantia* or *Thelephora*, since it passes insensibly into both. The celebrated FRIES has placed *Himantia domestica, rosea*, and *sulphurea*, as a subgenus to *Thelephora*. The remainder he has not yet described; but the present one will probably be included with most of them under the genus *Hypochnus*, alluded to at p. 452. of his first volume. In the mean time, I have continued the old established name.

LINK, in 7th volume of the Berlin Magazine, attributes a globose form to the sporidia: to me they appeared oblong.

Fig. 1. *H. candida*, natural size. Fig. 2. *One of the larger bundles of filaments with its ramifications* Fig. 3. *Filaments and sporidia;*—magnified.





POLYPORUS BETULINUS.

Birch-tree Polyporus.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *FUNGI, Link.*

GENERIC CHARACTER.

Hymenium cum pilei substantia homogeneum et concretum, poris dissepimentis tenuibus simplicibus instructum.—Pileus subcarnosus vel suberosus, plerumque subsessilis, substantia fibrosa, sicca.

Hymenium of the same substance as the pileus, not separating from it, and furnished with pores connected by simple dissepiments.—Pileus subcarnose or corky, mostly subsessile; substance fibrous and dry.

SPECIFIC CHARACTER.

POLYPORUS betulinus; *pileo carnoso, glabro, subreniformi, pallide fusco-rufescente, vertice obliquo brevissime stipitato, poris inæqualibus albis.*

P. pileus carnose, glabrous, somewhat reniform, pale reddish-brown, furnished with a very short obliquely vertical stipes; the pores unequal, white.

POLYPORUS betulinus, *Fries, Syst. Mycol.* v. i. p. 358.—*Grev. Fl. Edin.* p. 400.
BOLETUS betulinus, *Bull. Champ.* p. 348. t. 312.—*Bolt. Fung.* t. 159.—*Sow. Fung.* t. 212.—*Fl. Dan.* t. 1254.—*Pers. Syn. Fung.* p. 535.—*Alb. et Schwein.* p. 251.—*De Cand. Fl. Franç.* ed. 3. v. 2. p. 123.—*Ejusd. Syn.* p. 25.—*Schum. Sæll.* p. 338.—*Schwein. Fung. Carol.* No. 907.
BOLETUS suberosus, *Wulf, in Jacq. Coll.* v. 1. p. 344. *fid. Fries.*

HAB. On the trunks of Birch trees, in Summer and Autumn. Rosslyn Woods, rare.—In England, BOLTON records it as growing in Shackleton Wood, near Darlington; and SOWERBY received it from Hevingham, near Norfolk, where it was found by the Rev. Mr ALDERSON for several years on the same tree.

Pileus 4–6 inches broad, smooth, pale reddish-brown when mature, roundish, or somewhat reniform, the upper surface convex, with a thickish rounded margin, not quite sessile, but furnished with an extremely short, thick stipes, arising above the margin in an obliquely vertical manner. The surface of the pileus is often mottled with small pale spots, and the epidermis is easily injured. *Substance* fleshy when recent, but in the dry state remarkably light and friable. *Flesh* white, very thick. *Pores* white, or tinged with brown, irregular in length, narrow, the orifices toothed. *Sporidia* white, subglobose. In the young state, the whole plant is white, and sometimes attains the size of a hen's egg before any pores are developed. It is remarkable that, when fresh,

the pores can be separated in a mass from the pileus, as in the genus *Boletus*, to which, however, our plant has no farther resemblance, as the pores are really formed from the substance of the pileus, and are not tubes. Taste and smell rather acid.

This fungus, which is said to be common on the Continent, is certainly rather unfrequent in this country; and though it is figured by BOLTON and SOWERBY, it has not found its way into any of the local Floras in my possession. It is a species which dries uncommonly well by mere exposure to the air, but is more liable than many others to the depredations of insects. To prevent their attacks, BULLIARD recommends the fungus to be allowed to dry in the open air for a month; it is then to be placed for three or four hours in an oven in which bread has been baked; it is afterwards to be plunged for some minutes into a warm infusion of a small quantity of tobacco and cloves in water. The fungus is then allowed to dry; and, after having been again plunged into the same infusion cooled, is considered by BULLIARD to be perfectly safe. This method is equally applicable to many other species, as *Polyporus sulphureus*, &c. and several *Hydna*, &c.

I cannot ascertain what WITHERING had in view when he described his *Boletus betulinus*. He refers to BOLTON's figure, which is certainly our plant; but it is equally certain that *his* is not. It is probable he may have confounded two plants together, one of which may have been a variety of *P. varius*, according to Mr PURTON's opinion. On the other hand, the separation of the pores from the pileus, seems to indicate another species, though not our present one.

Fig. 1. *P. betulinus, mature plant.* Fig. 2. *Ditto, half-grown.* Fig. 3. *Ditto, young.* Fig. 4. *Portion of the pileus;* natural size. Fig. 5. *Pores.* Fig. 6. *Sporidia;* magnified.

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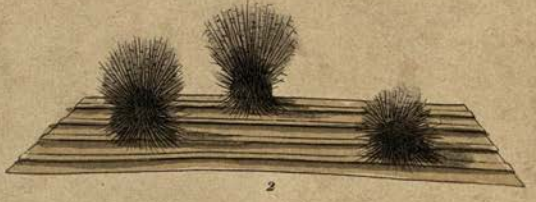

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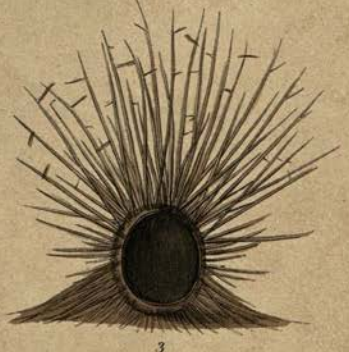

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CHÆTOMIUM ELATUM.

Tall Chætomium.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *GASTROMYCI, Link.*

GENERIC CHARACTER.

Peridium subglobosum, membranaceum, pilis opacis undique obsessum, demum dehiscens. Sporidia subpellucida, massæ gelatinosæ immixta.

Peridium subglobose, membranaceous, every where covered with opaque hairs, at length dehiscent. Sporidia somewhat pellucid, imbedded in a gelatinous mass.

SPECIFIC CHARACTER.

CHÆTOMIUM elatum; *peridio subturbinato, pilis basi breviusculis simplicibus, superne ramosis implexis longissimis; sporidiis ellipticis.*

C. peridium somewhat turbinate, the hairs rather short at the base and simple, very long, branched and entangled above; sporidia elliptical.

CHÆTOMIUM elatum, *Kunze, in Deutschl. Schwaemme,* Fasc. 8. p. 3. No. 184.

HAB. On dead or decayed culms of grasses, reeds, &c. Autumn to Spring. Near Glasgow, Mr SCOULAR. Abundantly on straw in a cellar in Edinburgh, and elsewhere in the neighbourhood.

Whole plant scarcely a line in height, and less in breadth; very dark brown. *Peridium* minute, somewhat of a turbinate form, thin, very fragile, thickly set with hair-like bristles, those towards the base pointing downwards, simple, and rather short; those above very long, branched at the end, and somewhat entangled, the branches short, divaricated. *Sporidia* numerous, elliptical, lying mixed in a gelatinous mass.

My learned friend Professor KUNZE established this genus in 1817, in the first part of "Mykologische Hefte," conducted by himself and M. SCHMIDT. He afterwards published our present species in the "Deutschland's Schwaemme," and refers to an unpublished monograph of the genus. All the species at present known, besides the one now represented, are

C. globosum of KUNZE, and *C. chartarum* and *gelatinosum* of EHRENBERG; the last only I am acquainted with.

At first sight, the species of this genus have a great resemblance to hairy *Sphæriæ;* and I must confess I regarded my own specimens as such previous to dissection. The structure of the peridium is however so delicate and fragile, that it is easy to perceive how far it is removed from the *Hypoxyla.*

May not *Sphæria comata* of TODE be a *Chætomium?* FRIES notices the extreme tenuity of the perithecia as well as TODE, "membranacea" "ob tenuitatem conservata semper fere diffracta," &c. I never saw what I believed to be *Sph. comata,* but suspect not only that, but some other hairy *Sphæriæ* might be better arranged under *Chætomium.*

Fig. 1. *Plants of C. elatum,* natural size. Fig. 2. *Three plants.* Fig. 3. *A peridium divided.* Fig. 4. *Hairs.* Figs. 5. & 6. *Sporidia;* magnified.

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PROTOCOCCUS NIVALIS.

Crimson Protococcus.

CLASS AND ORDER CRYPTOGAMIA ALGÆ, *Linn.*—NAT. ORD. *ALGÆ, Juss.*

GENERIC CHARACTER.

Globuli aggregati, nudi, granulis farcti, in gelatina hyalina imposita.

Globules aggregated, naked, containing granules, sessile upon a transparent gelatinous mass.

SPECIFIC CHARACTER.

PROTOCOCCUS nivalis; *globulis exacte sphæricis, minutissimis, vivide purpureis; gelatina pallida expansa.*

P. globules exactly spherical, very minute, fine purple red; gelatinous mass pale, spreading.

PROTOCOCCUS nivalis, *Ag. Syst. Alg.* p. 13.

PROTOCOCCUS kermesinus, *Ag. in Act. Acad. Nat. Cur.* v. 12. p. 749.

PALMELLA nivalis, *Hook. Bot. App. Parry's 2d Voyage, ined.*

PALMELLA, *Hook, in Edinb. Journ. of Science,* v. 1. p. 383.

UREDO nivalis, *Bauer, in Journ. of Science and Arts,* v. 7. p. 222. t. 6.—*Vid. Tab. ead. in Brown's Bot. Schrift. cur. Nees,* v. 1. fig. sup.

LEPRARIA kermesina, *Wrang. in Vet. Acad. Handl.* 1823, p. 71. t. 3.—*Vid. tab. ead. in Brown's Bot. Schrift,* l. c. fig. inf.

ALGARUM GENUS?? Confervis simplicissimis et Tremellæ cruentæ (Eng. Bot.) quodammodo affine?? *Brown, List of Plants Ross's Voy.* ed. 2.

TERRE rouge de la neige, *Sauss. Voy.* v. 2. p. 44.

HAB. "On the borders of the lakes of Lismore, spreading abundantly over the decayed reeds, leaves, &c. at the water's edge; but in greater perfection on the calcareous rocks within the reach of occasional inundation; more or less perfect at all seasons of the year."—Captain CARMICHAEL.

Plant composed of an innumerable multitude of globules, seated upon a colourless gelatinous stratum. *Globules* exceedingly minute, sessile, crowded, exactly spherical, fine purple-red or garnet colour. In their young state, they are mostly surrounded with a transparent border, which gradually disappears as the globules attain their full size: they are then almost opaque, brilliant, nearly uniform in size. In a good light, the surface appears reticulated, which is owing to enclosed granules. *Granules* about 6–8 in number, globose, escaping from the globules by a spontaneous rupture, sometimes singly, at others several adhering toge-

ther, yellowish or red. After the escape of the granules, the globule, or rather the empty membrane, is colourless, and, when immersed in water, floats on the surface. *Gelatine* expanded, shapeless, without any defined border, colourless, various in thickness; sometimes thinner, sometimes thicker than the globules. On this substance, the globules are sessile, or very slightly sunk, never immersed.

The remarkable substance brought by Captain Ross from the Arctic Regions, under the name of *Red Snow*, has excited in no ordinary degree the attention of the most eminent botanists and chemists. German, Swedish, French and British philosophers, have published observations upon it, and endeavoured, by every means within their reach, by direct experiment, or ingenious theory, to account for its presence, and ascertain its precise nature. It has been clearly proved to be of no unfrequent occurrence in most of the mountainous countries of Europe, and to flourish indifferently on the pure snow, rocks of limestone, or even on the surface of the ground, and decayed vegetable substances. In Scotland, the practised eye of Captain CARMICHAEL has enabled him to discover it in abundance; and it is to his kindness that I am indebted for native specimens to represent in this work.

In giving a brief history of this most singular plant, I derive great assistance from the labours of AGARDH * and NEES AB ESENBECK †. The memoir of the former will be found translated at the end of the present article; the account subsequently given by the latter, is, in every point of view, the most complete one published.

Chemical investigations I am compelled to omit, because my limits will not allow me to introduce them: they are, however, of less importance, for they do not militate against the conclusion that the *Red Snow* is of a vegetable nature.

When the *Red Snow* was first brought to England by Captain Ross, it was examined botanically by Mr R. BROWN and Mr F. BAUER. The sagacity of the former led him at

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* Nov. Act. Acad. Natur. Cur. v. xii. p. 737.

† Works of ROBERT BROWN, German edition, v. i. p. 343. et 571. et seq.

once to hint at the affinity the colouring matter bore with *Tremella cruenta*, Eng. Bot. near to which it has ever since remained. Mr BAUER, on the other hand, was struck with its resemblance to the minute *Fungi* of the genus *Uredo*, and, after a minute investigation, in which he detected pedicels to some of the globules, he concluded without hesitation that it was actually a *Uredo*, and named it *U. nivalis*. Deservedly celebrated as Mr BAUER is in microscopical examinations, it can scarcely be doubted, in the present instance, that he was deceived, as well as Baron WRANGEL afterwards. No other naturalists have ever been able to discover the pedicels; and the now better known relations of the plant render their existence in the highest degree improbable.

It was the opinion of SPRENGEL that the snow owed its red colour to an *Alga*, near *Vaucheria radicata*, AG.

The turn of investigation now fell to the learned AGARDH, to whom some of the original *Red Snow* was communicated. He came to the immediate conclusion that it was an *Alga*.

About this time, a plant was described by Baron WRANGEL, as a species of *Lepraria*, under the name of *L. kermesina*. The Baron met with it upon white limestone rocks, forming a thin crust, of a red colour; and he supposed, from a slight violet odour, that it was the long disputed *Byssus Iolithus* of LINNÆUS. Upon comparing this *Lepraria* with the *Red Snow*, it was evident to AGARDH that the two plants were one and the same; and he therefore published a long and interesting memoir upon the subject, in which, not finding the plant agree with the genus *Palmella*, he mentions a new one which he had formed to receive it, under the name of *Protococcus*. This is adopted by Dr NEES AB ESENBECK, in his elaborate account in "ROBERT BROWN's vermischte Botanische Schriften," where he has also given a plate, representing both the figures of BAUER and WRANGEL.

In regard to microscopical appearance and structure, Mr BAUER observes, that he found a number of transparent, colourless, spherical bodies, floating on the surface of the water, and that the red globules of various sizes sunk to the bottom. After a time, he ascertained that the red globules were situated

upon a cellular or articulate mass of root or spawn, similar to that which is common to most species of *Uredo;* and farther, that they were attached to this spawn by means of short pedicels, in the manner of a *Uredo.* AGARDH merely mentions that he saw a multitude of red, brilliant, opake, exactly spherical, sessile globules, and some that were colourless and transparent. He neither alludes to, nor denies the existence of a gelatinous substratum (the spawn of BAUER); but it is probable it escaped his notice, as he would otherwise have taken advantage of so important a part in the formation of his genus *Protococcus.*

Baron WRANGEL observed some additional facts, in his essay on the organization of *Lepraria kermesina,* and its conformity with the *Red Snow* *. As I have not access to the original article, I owe the following details to the excellent history already alluded to by Dr NEES AB ESENBECK. The author, says my learned friend, placed portions of limestone covered with *Lepraria kermesina* under water, and exposed them to the light of the sun: the red crust was soon detached, and a number of much smaller globules, of a yellow or pale colour, made their appearance, of which the larger red globules seemed to be composed. After a lapse of three days, the globules became animated like *Infusoria:* they swam about, and were frequently pursued and devoured by other *Infusoria (Paramaecium Aureola,* Mull. t. 12. f. 1.–14.) They sunk at last, and formed a mud-like deposit, while the smaller ones seemed to arrange themselves in lines. Stones which had been collected some time afterwards, in the same locality, exhibited the plant like a granulous, velvety green crust, on the side turned towards the ground, while on the surface exposed to the light it was red. Water had the same effect on both. After it was evaporated, the globules again assumed more or less the form of *Lepraria kermesina,* and re-application of moisture produced the same results. Mixed with snow, the red globules

* "Microscopiska och Physiologiska undersökningar röranda utrecklingen af Lepraria kermesina och dess likhet med den så kallade röda snön. Tillägg till Anmärkningarne rörande Byssus Iolithus, L."

separated into larger and smaller ones, and became of a brighter colour, which was permanent even when the melted snow containing them was frozen. On the subsequent solution of the ice, the author observed some to be supported on pedicels. He also saw some of the large globules, under the form of *Infusoria*, swim about, and on coming into contact with each other, burst, and give exit to smaller ones. The pedicel which Mr BAUER perceived in *Uredo nivalis*, was only seen by him in a similar case, the water having been formerly frozen. The author therefore leaves it undecided, whether the presence of the pedicel indicates another species or not. From a series of observations instituted from the 14th of May 1822 to the 2d of January 1823, it has been proved that the *Lepraria kermesina*, by being detached by water from rocks and stones, might flow down the surface of snow, and give origin to the phenomenon of *Red Snow*.

Baron WRANGEL, as well as Professor SPRENGEL, refer *Byssus Iolithus*, L. to the *Fungi*; but AGARDH and FRIES both dissent, and maintain, that *Byssus Iolithus* and *Lepraria kermesina* cannot belong to the *Fungi*, because they grow on the naked stone, and consequently are not produced by the previous decomposition of higher vegetable forms. Both naturalists place them among the *Algæ*; and AGARDH remarks, that having already assigned *Byssus Iolithus*, L. a place among the *Algæ*, *Lepraria kermesina* may also be inserted among those tribes bearing the closest analogy with the *Infusoria* of the animal kingdom *.

FRIES, in his "Systema Mycologicum," proposes the genus *Chlorococcum* to receive the *Uredo nivalis* of BAUER, the *Tremella cruenta* of English Botany, and *Tremella botryoides* of SCHREBER (*Palmella botryoides*, LYNGB.) †.

My valued friend Dr HOOKER having examined many authentic specimens produced on different substances, looks upon the *Red Snow* to belong to the genus *Palmella* of LYNGBYE, thus essentially coinciding with the views of M. FRIES.

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* BROWN'S Bot. Schrift. cur. NEES AB ESENBECK, v. i. p. 346.

† FRIES, Syst. Mycol. v. i. p. xv.–xvii. et v. ii. p. 235. et 272.

Dr HOOKER immediately ascertained the presence of a gelatinous substratum, and remarked in a letter to me, that the plant differed from *Palmella*, only in having the globules sessile upon the gelatine, instead of being immersed in its substance. My friend's observations will, I believe, be given at length in the Appendix to Captain PARRY's Second Voyage, at present unpublished.

That the plant is an *Alga*, has been also confirmed by Professor DE CANDOLLE, who expresses his opinion, in a letter to the Royal Academy of Paris *, that it is nearly allied to the genera *Ulva* and *Nostoc*. He not only disbelieves in its being a *Uredo*, but denies the existence of a pedicel, and supposes that the appearance of one has been produced by smaller globules attached to the larger ones. He denies the globules a granulous interior, and says he obtained by pressure only an oily substance. Professor DE CANDOLLE also maintains, that the spherical form, and long duration of the globules, are strong arguments against their being Infusory *animalculæ*. This opinion, NEES ab ESENBECK observes, is strictly correct, as applied to *Infusoria* in general, but not so in those instances where death in the animal is merely a transition to vegetable existence, under the form of an *Alga*. Here globules are not uncommon. We have always remarked, that the Infusory animalcule of the *Vaucheria bursata*, swam about in an elliptical shape during its animal life, and, in its subsequent change to vegetation, acquired a green colour, and spherical form †.

It must not be omitted, that my friend Mr PURTON, in the 3d volume of his "Midland Flora," p. 513. states, that he has been informed, on good authority, that the colour of the snow is derived from "*Tremella cruenta*, and not, as was supposed, from *Uredo nivalis*." He himself is of opinion that the plant has a greater affinity to *Tremella* than *Uredo*, since it is produced on the ground. But he thinks that it *may* be a *Uredo*, from the pedicels described by Mr BAUER, and from the granulated glutinous substance which issued from the ripe

* Ann. de Chimie, xii. p. 77.

† BROWN's Bot. Schrift. v. i. p. 577.

fungi, an appearance which Mr PURTON has observed in the true *Uredines* and *Pucciniæ*.

Having now related the principal facts and opinions known and advanced respecting this curious subject, I shall proceed to state the result of my own investigations; and it is necessary to premise, that I had made my drawing and dissections before consulting what other writers had done, with the single exception of Mr BAUER.

The specimens I examined were produced on stone, decayed mosses, and on dead leaves; some brought from the arctic regions, others from the Island of Lismore, on the coast of Scotland. I had them immersed in water for a period of three weeks, but did not succeed in tracing any appearance that was not developed equally well in the course of a few hours. In every instance, I found no difficulty in detecting a gelatinous substratum, various in thickness (sometimes exceeding the diameter of the globules), colourless, diffuse, without any defined border. Upon this gelatine rests a vast number of minute globules, the colour of fine garnets, exactly spherical, nearly opake, yet very brilliant, for the most part nearly equal in size: the smaller ones are generally surrounded with a white pellucid limb, like the capsules of *Ceramium roseum;* and this limb gradually becoming less as the globules enlarge, at last entirely disappears. In the full-sized globules, a favourable light shows the existence of internal granules, which make the surface to appear reticulated. When mature, they burst, and the internal granules escape, to the number of 6–8 or more, and the membrane only of the globule is left behind, buoyant and colourless. The granules are globose, and escape from the globules one by one, or by several at once, adhering together. Though I never could observe the least voluntary motion among any of these bodies, it is evident my observations very nearly coincide with those of Baron WRANGEL, who even beheld the bursting of the globules, and discharge of the granules. It also appears tolerably certain, that the floating colourless globules of BAUER and AGARDH were the empty cases that had parted with their contents. And it seems very probable that the following passage from BAUER's account, must be explained on

the same grounds: "I observed the *fungi* were gradually losing their colour, and small flakes of the jelly-like spawn became evident in several spots on the inner surface of the glass; and after the glass had stood at rest three days longer, I found the *fungi* had entirely lost their colour, and the new-formed spawn had increased considerably; and on bringing a small portion of the substance within the field of the microscope, I found the white spawn the same in appearance as that which I found in the original bottle, and a great many very minute colourless young *fungi* were adhering to its surface." In some specimens, especially such as occurred on dead leaves, &c. I observed frequently fine filaments resembling an *Oscillatoria*, but they did not present themselves in all; and therefore, though Baron WRANGEL has represented them in his figure as part of the plant, I regard them as merely adventitious bodies.

It is very remarkable that my friend AGARDH should have omitted to notice the subjacent gelatinous mass; and from his having created his genus *Protococcus* on the single character "Globuli aggregati non mucosi," I was at first inclined to follow Professor HOOKER, and place the plant in the genus *Palmella*. Upon reconsideration, however, the character of the naked globules, and the remarkable fact of the escape of internal granules, induce me to keep up the genus *Protococcus*, with an amended character.

Several conjectures have been hazarded in regard to the production of this plant, its origin, and the cause of its red colour. One theory will be found in the following memoir. The impression that it is precipitated from the atmosphere does not seeem to be removed from the minds of many: "J'ai dejà rappellé ailleurs," says the illustrious HUMBOLDT (Ann. de Chimie, xiv. p. 42.), "qu'au Paramo de Guanacos, où le chemin de Bogota à Popayan, passe à la hauteur de 2300 toises, on a vû tomber, non de la *neige*, mais de la *grêle rouge*. Renfermait elles ces mêmes germes d'organization végétale qui ont été découvertes au-de-là du cercle polaire?" Well might NEES AB ESENBECK exclaim, "Never, perhaps, was one of the most important questions that could be suggested by the naturalist so near being decided. If it had been actually examined, and

if the same organic vegetable bodies had been detected as in the *Red Snow*, there would scarcely be any doubt remaining, concerning the meteorological origin of those infusorial bodies, which become *algæ* after existing for a time in a state of animal being*."

If I understand the passage correctly, it does not appear that HUMBOLDT himself saw the fall of *Red Hail*. For my own part, I am willing to attribute a much more humble origin to the *Red Snow*. Like other *Algæ*, moisture seems essential to its production; and hitherto this plant has not been found in places where it was debarred from this pabulum, at some period of its growth. But, once formed, it seems to possess the power of remaining stationary, and perhaps of reviving after having been preserved for an unlimited period. In the Arctic Regions, it was discovered on snow, on rocks, on decayed mosses, and on the bare soil. In Scotland, its locality is curious. The Island of Lismore, in which it is found, is very low, 10 miles in length by only 1–2 in breadth, and resting on a limestone rock, of a slate-blue colour. "It occurs," says my friend Capt. CARMICHAEL, "in abundance on the borders of the lakes of Lismore, spreading over the decayed reeds, leaves, &c. at the water's edge, but in greater perfection on the calcareous rocks within the reach of occasional inundation; and, what is rather remarkable, it seems to thrive equally well whether immersed or exposed to the dry atmosphere. It is to be found more or less at all seasons of the year." If we connect this relation with the circumstance, that the red colour in the snow appears only after the snow has begun to melt, we may surely conclude that moisture is necessary for the original production of this *Alga*. Its seeds are exceedingly minute; but how they reach the surface of the snow in some cases, it is difficult to conjecture, though this difficulty ceases, when the snow is on a lower level than the surrounding rock. In 1818, M. CHARPENTIER found *Red Snow* on the Alp Anceindaz, near Bex; and six or seven years before, it was observed by THOMAS on the Alp Bovonas, three hours journey from Bex, at a place called *les Planards*. The red

* BROWN's Bot. Schrift, v. i. p. 574.

colour was either in distinct stripes, 1–20 feet long, and 3 inches to 4 feet broad, or forming roundish spots 5 inches to 3 feet in diameter *. This certainly appears more like the process of ordinary vegetation, than the effect of a shower of organic particles, which must have been very whimsical, indeed, to have fallen in such a manner. The most probable conjecture seems to be, that snow is not the natural situation of *Protococcus nivalis*, but that, being tenacious of life, it preserves its vitality when cast upon so chilling a surface, and under favourable circumstances, even propagates its species. If this be granted, it will be easy to see how wide a surface may soon be covered with a vegetation of this kind, by the flowing of the melted snow as it gradually dissolves; especially when we also consider, as AGARDH has well observed, how inconceivably rapid minute bodies of this kind increase. Having become once established in the snow, it is possible, that, by the intense cold of winter, the vegetating power may be suspended beneath the frozen surface, when, in other situations, it would have perished; and thus, on the annual dissolution of the superincumbent snow, our *Protococcus*, numerous as the grains of sand on the sea-shore, may start at once into renewed life, and seem indeed to have descended unseen from the clouds.

MEMOIR on the Red Snow brought from the Polar Regions. By Dr C. A. AGARDH, Professor of Botany, Lund.

(*Nova Acta Physico-Medica Academiæ Cæsariæ Leopoldino-Carolinæ Naturæ Curiosorum*, v. xii. p. 737.)

RAIN, mingled with minute extraneous substances, is by no means an unfrequent phenomenon. The most general appearance of this kind is what has been called a *shower of sulphur*: in repeated examinations, however, no sulphur has ever been detected, but in the place of it the *farina* of the fir (*Pinus sylvestris*). Some years ago a rain of this kind fell at Lund, and I had an opportunity of examining it. I found it mixed with this farina, though the nearest forest capable of supplying so large a quantity must have been distant five or six Swedish miles.

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* BROWN'S Bot. Schrift, v. i. p. 595.

After showers of sulphur, *showers of blood* are of the most frequent occurrence, and are far less understood. That which PIERESC examined at Aix in France, in the year 1608, was occasioned by insects; and so was the one which fell at Shonen in 1711, which was examined by HILDEBRAND, the clergyman. In this instance, the learned Bishop SWEDBERG pronounced it to be a miraculous production of the Divinity, and not a natural one. The rain which fell some years ago in Flanders had another origin, of which we shall speak afterwards. The important fact, whether the red particles actually fell with the rain, or whether they were produced on the moist surface of the earth after the rains had fallen, has generally been neglected; which is of more consequence, because there is another phenomenon to be classed along with the showers of blood. This is the *blood-red water*, supposed by the common people to be water changed into blood; it is mentioned by many writers, and seems to be, or rather certainly is, of two kinds. The ordinary kind noticed by LINNÆUS in the Literary Gazette of SABIUS (?), makes its appearance in spring and summer in pools of water, and owes its colouring matter, according to him, to a prodigious number of *Monoculus Pulex*, L. (*Daphinia Pulex*, Latr.) *; but according to my own observations to *Monoculus quadricornis*, L. (or *Cyclops quadricornis*, Latr.), which dye the water with their red bodies. LINNÆUS speaks of another kind of blood-red water in his *Westgotha Resa*, which had a pulverulent appearance, and occurred in the cavities of calcareous mountains moistened by rain-water. That which is found on the sea-shore is only a dye given out by some species of sea-weed.

These observations become worthy of attention when we consider them in connection with the *red snow* discovered some time ago near the North Pole, and which excited such a degree of astonishment among naturalists, that it might be concluded it was either a solitary instance, or of very rare occurrence, and little known. Nevertheless, red snow is a very common appearance in all the alpine countries of Europe, though DE SAUSSURE, if I be not mistaken, was the first who noticed it. He found it for the first time in the year 1760, on Mount Breven in Switzerland, and subsequently so frequently among the Alps, that he was surprised how such a phenomenon could have escaped the attention of other travellers, especially SCHEUCHZER. RAMOND found red snow on the Pyrenees, and the botanist SOMMERFELDT informed me he observed it in Norway.

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* It is very singular that LINNÆUS, who seems to have been well acquainted with this *Monoculus Pulex*, should attribute the colour of the water to it. I have only found a *Cyclops* in that kind of water, agreeing in every respect with *C. quadricornis* of LATREILLE, and unlike *Monoculus quadricornis* of LINNÆUS in being red instead of brown: either the colour must change, or there are two species.—AG.

The Italian *Giornale di Fisica*, Nov. and Dec. 1818, contains some very interesting accounts of red snow which fell on the Italian Alps and on the Apennines, which we shall mention here, as they are less generally known. In March 1808, the whole country around Cadore, Belluno, and Feltri, was covered in one night, to the depth of twenty centimetres, with a rose-coloured snow. A pure white snow fell before and afterwards, so that the coloured snow formed an intermediate stratum. The same fact was recorded at the same time on the mountains of Veltelin, Brescia, Krain and Tyrol. A similar one occurred at Tolmezzo in the Friaul, between the 5th and 6th of March 1803; and a more remarkable one still, in the night between the 14th and 15th of March 1813, in Calabria, Abruzzo, Tuscany, and Bologna, consequently along the whole chain of the Apennines. On the 15th of April red snow fell on the mountain of Toual in Italy.

From the above account, it is evident that this phenomenon is not unfrequent, and that the red snow discovered in Baffin's Bay, in 75° 54′ N. Latitude, and 67° 15′ W. Longitude, by Captain Ross, derived the greater part of its interest from the celebrity of those botanists and chemists by whom it was so carefully examined, and it was the result of their examinations that raised so many conjectures regarding its origin.

According to Captain Ross, the mountains which were covered by the red snow are about eight English miles long, and about 600 feet in height. The red snow was found to penetrate in some places to a depth of 10 or 12 feet, and seemed to have existed long in the same state.

This is all the information we possess relative to the red snow in its natural situation; from chemical analysis, however, some account of its nature might be reasonably expected. By this means, De Saussure had already ascertained the colouring matter of the red snow of the Alps to emit a smell, when exposed to heat, like that of burnt vegetable substances; and this circumstance, together with distillation in alcohol, led him to draw the conclusion that the matter was of a vegetable origin, and perhaps the farina of some plant, although he could not particularise any plant with red pollen, nor conjecture how it could have been carried to so great an elevation.

The Italian naturalists who examined the red snow we have already mentioned as having fallen in Italy, found it to contain siliceous earth, clay, and an oxide of iron, as well as a considerable proportion of some organic substance. Such also were the products of an analysis made by Sementini of a *shower of blood* which fell in Calabria; nor did Wollaston and Thenard in their examination of the red snow brought home by Captain Ross, arrive at any other results, and the former suggested that it might contain the seeds of a moss.

From the chemist this curious substance passed into the hands of the botanist. The celebrated FRANCIS BAUER communicated a full description of it to Mr BRANDE, the Secretary of the Royal Society, for publication in the Journal of Science and Arts, No. XIV. The similarity in regard to form as well as chemical analysis, induced him to conclude that the colouring matter was a fungus of the genus *Uredo*. He accordingly names it *Uredo nivalis*, and gives it a place near *Ustilago segetum* of DITMAR.

Mr ROBERT BROWN had indeed previously expressed his opinion that it might eventually prove an *Alga*, from its great resemblance to *Tremella cruenta*, Eng. Bot., a fact which Mr BAUER does not seem to be aware of.

SPRENGEL's conjecture, that it more nearly approaches *Vaucheria radicata*, Ag. seems to have less foundation than any other.

In numerous examinations I have had occasion to make of the *Algæ*, the true nature of this substance has frequently occurred to me as a perplexing question; for never having seen any thing with which it might be compared, I could never find a satisfactory answer. The opinion, however, of Mr R. BROWN, that it should be classed with the *Algæ*, always appeared to me to be the most correct.

At length I received from the Royal Academy of Sciences at Stockholm, a treatise by Baron WRANGEL on a new species of Lichen, which he named *Lepraria kermesina*, and observed that LINNÆUS had confounded it with the *Byssus jolithus*. Between the new lichen and the *Uredo nivalis* I found a very striking similarity, and in my report upon the treatise I not only expressed this opinion, but pronounced the newly discribed plant to be an *Alga*. Yet I had neither seen the *Lepraria kermesina* of Baron WRANGEL, nor the colouring substance of the red snow; and my judgment was formed entirely upon the very minute description of Baron WRANGEL. At length I was enabled to satisfy myself, for in the summer of 1823, which I passed at Stockholm, Professor BERZELIUS gave me some of the colouring matter of the red snow, which had been sent to him by WOLLASTON, and the Baron shewed me his *Lepraria kermesina*.

The *Uredo nivalis* along with the melted snow, had been preserved in a well-closed and sealed phial, and had not been opened. The *Uredo nivalis* had neither lost its form nor red colour during five years. The water was perfectly fresh, and had no smell. When at rest, the colouring matter remained at the bottom, in the form of a brownish sediment, two or three lines in thickness, leaving the water quite clear; but on the least motion the red particles became mingled with it.

Anxious to obtain an accurate examination of this remarkable substance, I placed a drop of the water mixed with the brownish-red par-

ticles under the microscope, and observed a multitude of little blood-red, brilliant, yet opake, globules, perfectly round and sessile, and according faithfully with Mr BAUER's description. Some of the globules, however, were colourless, clear, and transparent. The size attributed to them by BAUER, $\frac{1}{100}$th of a line, was rather different in these specimens, and some were even half the diameter of the rest: compared with *Tremella cruenta*, Eng. Bot., their general diameter is larger than the globules of that *Alga* in the proportion of ten to one. The globules were variously aggregated: they were often solitary, sometimes two or three were formed into a line, at others they constituted little clusters, partly cemented by the remains of decomposed globules.

The *Lepraria kermesina* is a plant which the Baron WRANGEL found in the Province of Nerike, in part forming a kind of crust on white limestone, and in part detached and contained in the rain water remaining on the limestone. It is of a blood-red colour, and from its faint violet-smell, the Baron was induced to believe it to be the *Byssus jolithus* of several authors. This is the same substance alluded to by LINNÆUS in his *Westgotha Resa*. After a very minute examination, my original opinion regarding its affinity with *Uredo nivalis* was not only confirmed, but I ascertained that the two plants were actually one and the same species. I was fully satisfied, therefore, that as the *Lepraria kermesina* did not descend with the rain, the red snow must also have some other origin. The following observations may possibly contribute to explain this singular phenomenon.

Although the fact has never been clearly demonstrated, yet we may presume, that, next to heat, the agency of light is most essential to the production of the lower *Algæ*, and of the *infusory animals*; between the two, indeed, there is that connection, that, as I have endeavoured to shew in another place, they not only pass into each other, but are really sometimes different states of the same thing. When plants of a more perfect structure grow on white limestone, it is known that their flowers have a tendency to become red. How much more forcibly, then, must this law operate upon plants like the *Algæ*, in which colour is an essential part. Consequently, as we find *Anthyllis vulneraria* var. *coccinea* only on a chalky ground, we find among the *Algæ* that *Tremella cruenta*, Eng. Bot., the pink-coloured *Byssus cobaltiginia* and the *Lepraria kermesina* are only found on limestone or a limestone soil. That light produces the red colour in *Lepraria kermesina* is satisfactorily ascertained by the red colour gradually changing to green, as it occurs more or less secluded from the light in the fissures of the rock, or the under surface of stones. But the colour s not determined by light alone, but partly by the nature of the body on which it impinges, although in a manner beyond our comprehension. Thus, it is a well established fact,

that the rays of light are reflected from the surface of all white bodies without exception, however different such bodies may be from one another in every other respect; but no one can indicate or explain why this phenomenon is common to objects so variously diversified. It is sufficient for our purpose to admit that we need not be astonished when we find that white bodies, greatly dissimilar among themselves, agree in producing a similar vegetation, especially a vegetation chiefly characterised by colour. Such being the case, it will appear less incomprehensible, why *Uredo nivalis*, produced in the cold of winter only on the highest Alps, in the most northern latitudes, and on the surface of the snow, should be again detected in the summer on the surface of the brilliant white limestone of the plains, in the form of *Lepraria kermesina*.

Hence we must conclude, that the *Uredo nivalis* and the *Lepraria kermesina* are alike called into existence by the gradual melting of the snow, and the intensity of light in their relative situations; and that they are neither washed down from the rocks, as some persons believe, nor precipitated from the atmosphere, as might be inferred from the accounts transmitted from the Italians.

As to the first case, had such a red-coloured stream flowed down the mountains, DE SAUSSURE, and the English sailors who beheld the phenomenon of the red snow at the North Pole, would certainly have perceived it. DE SAUSSURE, on the contrary, expressly denies it, and as the English are silent, we may infer they did not see it.

As to the opinion that the red snow fell from the sky, which was credited by many even learned individuals, I wish to call their attention to the fact in which all accounts agree, that it invariably fell during the night, and that of course nobody ever saw it fall. Why should it fall only in the night, and not in the day, when light would have rendered a white body stained with red so conspicuous?

On the contrary, it is my opinion, that, after the sun has dissolved the surface of the snow by its warmth, the vivifying power of its light, conjoined with the incomprehensible property resident in the whiteness of snow to influence colour, contribute to the production of *Lepraria kermesina*. Its existence, however, does not become obvious till the mass of particles is of sufficient thickness, in the same manner as the colour of a drop of water is not developed till many drops form a sea. This opinion is not only confirmed by DE SAUSSURE, who observes, "qu'on ne trouve la neige rouge que dans une certaine période de la fonte des neiges, car lorsqu'il ne s'en est pas beaucoup fondu, la quantité du residu rouge est très petite, et s'il en est trop fondu, on n'en trouve rien;" but also by the appearance of red snow in Italy in March and April only,—the two months in which the melting of the snow commences.

This hypothesis seems to be opposed by the observations made by Captain Ross, that the red snow penetrated at some places as much as 12 feet beneath the surface; but another traveller, on board the Alexander, expressly contradicts this statement by saying, that it was never found deeper than one or two inches. The observation made in Italy that white snow fell both before and after the red, is easily explained by what has been said before; and it is certainly more probable, when we consider the great extent over which the phenomenon spread in one night, that the effect should be as I have related upon a homogeneous surface, than that red snow should fall from the atmosphere, in a single night, throughout the whole of the Italian chain of mountains. That this snow was perceived after one night, I have in part explained, as the red colouring matter did not attract attention, till it had accumulated into a sufficient mass; and this will create little wonder in those naturalists who are accustomed to examine *infusory animals*, and who are well aware how rapidly an innumerable multitude start into existence under favourable circumstances.

It now only remains for us to determine what this substance really is which has given rise to so much discussion.

De Saussure's opinion, that it might be the pollen of a plant, is refuted at once by there being no plant with pollen of a red colour. He does indeed endeavour to support his conjecture by saying that the pollen may have been changed in its colour by exposure to intense light upon the Alps. But were this possible, it is inconsistent with chemical analysis.

Mr Bauer's idea that it is a *Fungus*, is entitled to more consideration. Nevertheless, I believe it to be entirely devoid of foundation. The *Fungi* are the offspring of darkness, and, so far from being aquatic, they have mostly the property of repelling water; they grow best in obscurity, and in a moist and foggy atmosphere; they are produced by putrid substances, and water destroys them; properties in no way applicable to a substance existing independent of putrefaction, in the purest water, the most intense light, and the rarest atmosphere.

The Baron Wrangel regarded the object which he described, and which I have shewn to be identical with the red snow, as a lichen of the genus *Lepraria*, and was led to form this opinion by the crust which it formed on limestone. This crust I believe to be the sediment which the evaporation of the water leaves on the ground. De Saussure's observation, that it is formed in melted snow, proves at the same time that it is not necessarily confined to stones. It is also removed from *Lepraria* not less by its form than by its chemical properties.

It follows, therefore, that this matter must be either an *Alga* or an *infusory animal*. But I am not aware of any great distinction betwixt them, for there occur objects which might be equally claimed by both. There are *Algæ* which produce *Infusoria*, and *vice versa*. Lastly, there are *Infusoria* which at one period of their existence are endowed with motion, and at another seem to pass into a state of vegetation.

We may observe, in conclusion, that the colouring matter of the red snow is not without analogy among the *Algæ*. Every one is acquainted with a green pulverulent substance on shady walls in autumn, consisting of green globules, changing according to circumstances into *Oscillatoria muralis* or *Ulva crispa*. This is most like *Lepraria kermesina*. *Tremella cruenta*, Eng. Bot. (which must not be confounded with *Ulva montana*, Lightf.) has also a great resemblance to it: both are red, and consist of minute globules; but those of *Lepraria kermesina* are free, instead of lying in a gelatine. I have therefore introduced it into my *Systema Algarum* as a distinct genus, under the name of *Protococcus kermesinus* *.

If my views of this body, which may be denominated the *Flower of the Snow*, be correct, our admiration will only receive a new direction. If we cease to believe that *Algæ* or *Infusoria* descend in showers, we must admit that the snow of a whole mountain may be covered, in the course of a few days, by a red vegetation, strongly contrasted with its own white hue. We must admire the activity of that Power which is so universally diffused, filling the bosom of even the winter-snow with life and vegetation. It is generally known that the colours of plants become duller and paler in proportion as they are withdrawn from the influence of light, and that the fields of the north boast of few bright hues, while the tropics abound with all the splendour of colour. Yet the north, in its Alps, approaches the source of light, and, by means of its snows, condenses the power of its beams, so as to produce the same effects as the warmest summer. Nature in all her forms, ever different, ever changing, is in one thing only the same, ever new and equally wonderful.

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* In the *Systema Algarum* it is called *Protococcus nivalis*.—G.

Fig. 1. *Protococcus nivalis, on blue limestone from the island of Lismore.* Fig. 2. *Ditto on a dead leaf from the same place.* Fig. 3. *Ditto on pale limestone from the arctic regions;* natural size. Fig. 4. *Group of globules.* Fig. 5. *Globules with their subjacent gelatine removed from the stone.* Fig. 6. *Mature globules, mixed with younger ones.* Fig. 7. *Mature globules; some of them burst, and the escaped granules lying on the gelatine.* Fig. 8. *Young globules of different ages removed.* Fig. 9. *Full-sized globules.* Fig. 10. *Globules after having discharged their granules.* Fig. 11. *Granules;*— more or less magnified.

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AGYRIUM RUFUM.

Red Agyrium.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *GASTROMYCI? Link.*

GENERIC CHARACTER.

Receptaculum homogeneum, ceraceum, humidum gelatinosum, innato-sessile, sphæricum, lævе, undique glabrum et fructificans superficie in sporidia demum fatiscente.—FRIES.

Receptacle homogeneous, wax-like, gelatinous when moistened, innato-sessile, round, even, the whole surface glabrous and fructifying, the exterior at length dissolving into sporidia.

SPECIFIC CHARACTER.

AGYRIUM rufum; *gregarium convexum vel sphæricum, compactum, humidum incarnatum, siccum rufo-fuscum.*—FRIES.

A. gregarious, convex or spherical, compact, red when moist, reddish-brown when dry.

AGYRIUM rufum, *Fries, Syst. Mycol.* v. 2. p. 232.

STICTIS rufa, *Pers. Obs. Mycol.* 2. p. 74. t. 6. f. 6.—*Mycol. Europ.* 1. p. 338.

TREMELLA Stictis, *Pers. Syn. Fung.* p. 628.—*Alb. et Schwein.* p. 304.—*Schwein. Fung. Carol.* No. 1146.

HAB. On old dry dead wood, especially of Fir-trees. Appin, Captain CARMICHAEL. At all seasons.

Plant gregarious, minute, about one-third of a line in breadth, innate-sessile, convex, or nearly spherical, varying in colour when moist from rather pale to dark red, when dry reddish-brown or nearly black. In substance compact, firm, homogeneous. The whole surface is smooth, even, covered with fructification, at length dissolving away into sporidia. Each plant is generally seated on a little whitish spot. *Sporidia* oval.

Agyrium is a good and natural genus established by FRIES in his Systema Mycologicum. The species are six in number, of which the present one was formerly a *Stictis*, and another a *Tremella*. They are all minute, gregarious, produced on wood,

sessile, or somewhat immersed, and frequently seated on a pale crust-like spot. FRIES very correctly remarks, that they have the habit of minute *Lecideæ*, destitute of a border.

Agyrium rufum is not only new to Great Britain, but the first of the genus published in this country.

Fig. 1. *A. rufum*, natural size. Fig. 2. *Plants.* Fig. 3. *A plant divided.* Fig. 4. *The surface dissolving into sporidia*;—magnified.

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HYSTERIUM VARIUM.

Irregular Hysterium.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *HYPOXYLA, De Cand.*

GENERIC CHARACTER.

Crusta nulla. Perithecium plerumque oblongum, corneum, rima longitudinali dehiscens. Sporidia in tubulis hyalinis, elongatis, erectis, gelatinosis.

Crust none. Perithecium mostly oblong, corneous, bursting by a longitudinal opening. Sporidia contained in hyaline, elongated, erect, gelatinous tubes.

SPECIFIC CHARACTER.

HYSTERIUM varium; *superficiale, lineare, oblongum vel subrotundum, obtusum, nigrum; labiis obtusis "demum apertis."*

H. superficial, linear, oblong or roundish, obtuse, black; margins obtuse, "at length open."

HYSTERIUM varium, *Fries, Syst. Mycol.* v. 2. p. 582.

HAB. On Oak trees. Appin, Captain CARMICHAEL.

Perithecia gregarious, black, dull, superficial, very variable in form, linear, oblong, elliptical, or roundish, rarely more than a line in length, sometimes considerably elevated, obtuse at both extremities. *Lips* or *margins* rounded, obtuse, closed, "at length open." *Sporidia* oval.

This polymorphous species is here added to the British Flora by my indefatigable friend Captain CARMICHAEL, whose discoveries have so frequently enriched the present publication. It was marked by him as a new species (probably before the second volume of FRIES's System had appeared); but I have little hesitation in referring it to *H. varium*, with which it agrees in all important points.

Fig. 1. *H. varium*, natural size. Fig. 2. *Perithecia of different forms.* Fig. 3. *Other perithecia, one of them vertically divided.* Fig. 4. *Thecæ, intermixed with Paraphyses and Sporidia*;—more or less magnified.

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THELEPHORA Padi.

Reddish, minutely bristly Thelephora.

Class and Order CRYPTOGAMIA FUNGI, *Linn.*—Nat. Ord. *FUNGI, Link.*

GENERIC CHARACTER.

Hymenium cum pileo homogeneum et concretum, papillosum vel planum, setosum vel glabrum, undique fructificatione obsitum.—Pileus persistens, coriaceus, plerumque adnatus vel resupinatus.

Hymenium of the same substance, and not distinct from the pileus, papillose or plane, minutely bristly or glabrous, everywhere covered with the fructification.—Pileus persistent or coriaceous, mostly adnate or resupinate.

SPECIFIC CHARACTER.

Thelephora Padi; *resupinata, effusa, tenuis, griseo-ferruginea, setulis brevissimis obsita, subpapillata.*

Th. resupinate, effused, thin, ferruginous, with a grey bloom, set with very short, minute bristles, almost quite destitute of papillæ.

Thelephora Padi, *Pers. Mycol. Europ.* 1. p. 142.

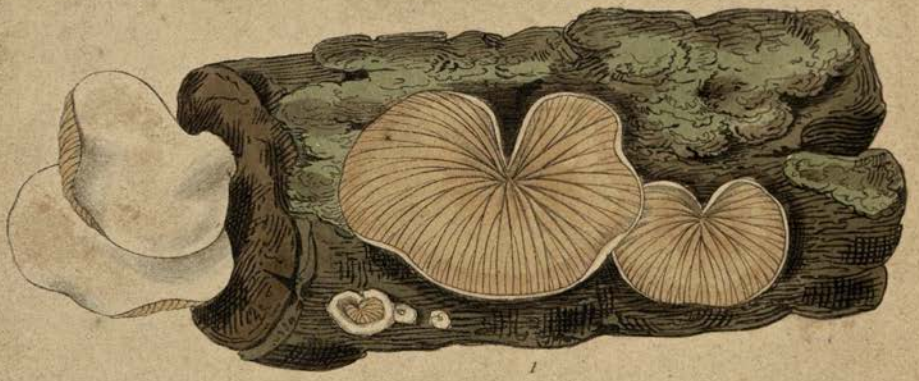
Hab. On the trunks of dead trees, not only of *Prunus Padus*, but Oak and Hazel. Appin, Captain Carmichael. Woods about Edinburgh.

Plant resupinate, spreading, 3–6 inches in length or more, and 2–3 inches in breadth, of a dry thin substance, following most closely every inequality of the bark, the margin not in the least byssoid, forming roundish irregular lobes. The *surface* is nearly destitute of *papillæ*, even, or more or less rugged, according to the nature of the bark beneath, thickly set with exceedingly minute, short bristles. The *colour* is opaque, ferruginous-brown, with sometimes a slight purplish tinge, and a grey bloom, as if it had been covered with a very thin wash of white body-colour. *Bristles* under the microscope jointed. *Sporidia* globose, very minute.

My friend Dr Mougeot has favoured me with authentic specimens of *Thelephora Padi* of Persoon, with which our British plant most perfectly accords. Specimens kindly communicated by Captain Carmichael, were named by that naturalist *Thelephora fusco-purpurea* of Persoon, a plant,

which, judging from PERSOON's brief description, I suspect to be nothing more than a variety, or perhaps a young state of *T. Padi.* PERSOON has introduced into his specific character of our plant certain longitudinal *plicæ*, or folds which frequently occur; but he questions whether they be constant. They appear to me to be often occasioned by the epidermis of the bark, which in several trees, as oak, hazel, birch, &c. separates, and becomes revolute, being incrusted continuously by the fungus.

Fig. 1. *Th. Padi,* natural size. Fig. 2. *A portion removed.* Fig. 3. *A smaller portion.* Fig. 4. *The bristles removed.* Fig. 5. *Sporidia;* magnified.



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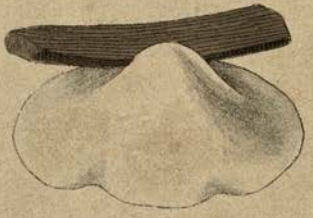

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AGARICUS VARIABILIS.

Variable sessile Agaric.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *FUNGI, Link.* SERIES IV. DERMINUS.—TRIBE XXX. CREPIDOTUS, *Fries.*

GENERIC CHARACTER.

Pileus stipitatus aut latere affixus, subtus lamellis sporuliferis, rectis, simplicibus. Volva nulla.

Pileus furnished with a stipes, or fixed by its side, having on the under surface straight, simple, sporuliferous lamellæ. Volva none.

SPECIFIC CHARACTER.

AGARICUS variabilis; *pileo membranaceo, e resupinato reflexo, sericeo tomentoso albo, lamellis albido-rufescentibus.*

AG. pileus membranaceus, resupinate, at length reflexed, sericeous, tomentose, white, lamellæ white, becoming reddish.

AGARICUS variabilis, *Pers. Obs. Myc.* 2. p. 46. t. 5. f. 12.—*Syn. Fung.* p. 483.—*Alb. et Schwein.* p. 231.—*De Cand. Fl. Franç.* v. 2. p. 135.—*Ejusd. Syn.* p. 28.—*Schwein. Fung. Carol.* No. 815.—*Grev. Fl. Edin.* p. 396.

AGARICUS sessilis, *Bull. Champ.* t. 152. et 581. f. 3.—*Schum. Fl. Sæll.* p. 366.—*Fl. Dan.* t. 1556.—*Relh. Fl. Cant.* ed. 3. p. 542.—*With. Bot. Arr.* ed. 6. v. 4. p. 362.

AGARICUS niveus, *Jacq. Fl. Aust.* t. 288.—*Dicks. Crypt.* fasc. 1. p. 17.—*Sow. Fung.* t. 97.—*Purt. Midl. Fl.* v. 2. p. 659.

HAB. On dead trunks and branches of trees, sticks, stalks of herbaceous plants, &c. in autumn. Very common.

Pileus half an inch to above one inch in breadth, round, or reniform, entire, sessile, resupinate at first, becoming gradually reflexed, so as ultimately to be only attached by its side, or obliquely by a small portion of its upper surface; very thin, membranaceous, delicate, pure white, downy; *flesh* almost none. *Lamellæ* rather numerous, narrow, much acuminated as they approach the margin, at first white, gradually changing to a reddish colour slightly tinged with pink, darkest towards the base, their common point of origin excentrical.

A very variable species, both in size, form, and mode of attachment. The prevailing characters are mentioned in the de-

scription; but the mycologist must be prepared to find it very whimsical. FRIES says that it sometimes is furnished, when young, with a short, central, incurved stipes, which becomes lateral and obliterated, after the pileus is reflexed. The substance, delicate texture, and colour, are constant.

Fig. 1. *Ag. variabilis.* Fig. 2. *A pileus attached by a portion of its upper surface, from growing on the under side of a branch.* Fig. 3. *Section of part of a pileus;* all natural size.

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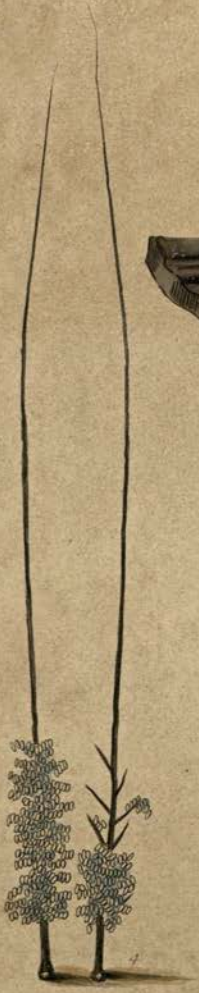

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CHÆTOPSIS Wauchii.

Crowded Chætopsis.

Class and Order CRYPTOGAMIA FUNGI, *Linn.*—Nat. Ord. *BYSSOIDEÆ, Grev.*—MUCEDINES, *Link.*

GENERIC CHARACTER.

Fila minuta, continua, erecta, opaca, setiformia, basi ramulis brevibus instructa. Sporidia pellucida nuda, inter ramulos coacervata.

Filaments minute, continuous, erect, opaque, bristle-shaped, furnished with short branches at the base. Sporidia pellucid, naked, collected among the branches.

SPECIFIC CHARACTER.

Chætopsis Wauchii;.....

Chætopsis Wauchii, *Grev. in Edinb. Phil. Journ.* v. 13. p. 63. t. 1. f. 1.

Hab. On rotten wood in the Spring. Foxhall, Captain Wauch.

Plants gregarious, erect, less than two lines in height. *Filaments* bristle-shaped, very slender, exceedingly attenuated towards the apex, dark brown, opaque, not jointed, furnished near the bottom with a few very short, mostly simple, somewhat spreading branches, among which the *sporidia* are crowded in a cylindrical mass. *Sporidia* free, oblong, whitish, pellucid, occupying about a fourth or fifth part of the length of the entire filament.

It has never fallen to my lot, since the commencement of this work, to record a plant more curious than that now figured. In regard to its affinities, I am quite at a loss; indeed, it seems to be the intermediate link between the persistent and the more evanescent *Byssoideæ*,—the filament appearing to belong to the former, and the sporidia to the latter. The erect filaments are so slender, that they are scarcely visible to the naked eye, unless when placed in a favourable light; so that the whole plant at first sight seems nothing but a minute greyish-white body.

A single specimen only has been discovered, for which I am indebted to my friend Captain WAUCH.

Fig. 1. *Ch. Wauchii.* Fig. 2. *A few plants removed;* natural size. Fig. 3. *Plants enlarged.* Fig. 4. *Ditto.* Fig. 5. *A plant with all the sporidia fallen.* Fig. 6. *Sporidia;* more or less magnified.

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XYLARIA POLYMORPHA

Polymorphous Xylaria.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *HYPOXYLA, De Cand.*

GENERIC CHARACTER.

Receptaculum carnosum vel suberosum, stipite instructum. Perithecia in receptaculo immersa, intùs massa gelatinosa sporulifera repleta.

Receptacle carnose or suberose, furnished with a stipes. Perithecia immersed in the receptacle, and containing a gelatinous sporuliferous mass.

SPECIFIC CHARACTER.

XYLARIA polymorpha; *carnoso-suberosa, gregaria, turgida, obtusa, varia, ex albido nigra, clavula undique peritheciis cincta; sporidia ovalia.*

X. between carnose and corky, gregarious, turgid, obtuse, of various forms, whitish, at length black, every part except the stem producing perithecia. Sporidia oval.

XYLARIA polymorpha, *Grev. Fl. Edin.* p. 355.

SPHÆRIA polymorpha, *Pers. Comment.* p. 17.—*Obs. Mycol.* 2. p. 64. t. 2. f. 2. 4, 5.—*Syn. Fung.* p. 7.—*Alb. et Schwein.* p. 3.—*De Cand. Fl. Franç.* ed. 3. v. 2. p. 283.—*Ejusd. Syn.* p. 59.—*Nees, Syst,* t. 40. f. 307.—*Hook. Fl. Scot.* Pt. 2. p. 4.—*Schwein. Fung. Carol.* No. 11.—*Fries, Syst. Mycol.* v. 2. p. 326.—*Holl. et Schmidt, Deutsch. Schwaem. Exsicc.* No. 28.—*Fries, Scler. Suec.* No. 221.

SPHÆRIA digitata, *Fl. Dan.* t. 900.—*Sow. Fung.* t. 69.—*Relhan, Fl. Cantab.* p. 569. *in part.*—*Purt. Midl. Fl.* v. 2. p. 716. et v. 3. p. 495. *in part.*

SPHÆRIA carchariæ, β obtusa, *Weig. Obs. Bot.* p. 49. t. 3. f. 3.

SPHÆRIA cotyliglossa, *Rebent. Fl. Neom.* t. 1. f. 1.

VALSA clavata, *Scop. Fl. Carn.* 2. p. 398.

CLAVARIA digitata, *Sibth. Fl. Oxon.* No. 1123.—*Holmsk.* v. 1. p. 64. *cum icone. With. Bot. Arr.* ed. 6. v. 4. p. 439.

LICHEN-AGARICUS, qui lithophytoides terrestre digitatum, nigrum, *Mich. Gen. Pl.* t. 54. f. 4.

HAB. On the stumps of trees, generally close to the ground; not rare. Spring to Autumn.

Plant gregarious, often cespitose, very irregular in figure, sometimes short and almost confluent, but mostly 2–4 inches in length, one-third to two-thirds of an inch in diameter, rounded at the apex, cylindrical, oblong obovate, perfectly simple, or somewhat lobed, and terminating below in

a stipes, which varies greatly in thickness; in a young state, the colour is whitish, but at length changes to a brownish-black. *Substance* between fleshy and corky, when dry very hard, white within, and radiated towards the circumference. The whole surface except the stipes contains perithecia. *Perithecia* roundish, black, the orifices minutely prominent. *Thecæ* filiform. *Sporidia* oval.

This is the largest and most robust of all the stipitate species belonging to the *Sphæroideæ*, being often above three inches in height, and sometimes nearly one in thickness. In its propensity to vary from the proper figure, which may be said to be between cylindrical and obovate, it exceeds every plant of its tribe, and yet is almost invariably well distinguished from the *Sphæria digitata* of EHRHART, by the obtuse and fertile summit of the receptacle. FRIES observes, that a cavity is occasionally found in the heart of this species, and that it is a solitary instance among the *Hypoxyla*. Till recently, there has always existed more or less confusion between this species and *Sphæria digitata* and *Sph. Hypoxylon*. FRIES has disentangled the conflicting synonymes; and I hope to illustrate them in a short time by faithful representations. I cannot omit to notice one singular error into which British writers have generally fallen: they have very properly neglected the natural-size figures in BOLTON's plate of what he calls *Sphæria digitata*, but selected as the true plant the figure marked *h*, which is only a magnified representation of one of the others.

It will scarcely be credited, in this advanced period of botanical science, that our present plant is called *Clavaria digitata* in the last edition (the sixth) of WITHERING's Botanical Arrangement.

Fig. 1. *A group of plants.* Fig. 2. *A plant of another form.* Fig. 3. *A longitudinal section;* natural size. Fig. 4. *A portion of the exterior of the receptacle.* Fig. 5. *Thecæ and sporidia;* magnified.

DÆDALEA QUERCINA.

Common Dædalea.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *FUNGI, Link.*

GENERIC CHARACTER.

Hymenium sinuosum. Sinuli cum pilei suberosa substantia homogenei et concreti, firmi, subprofundi, varii; nunc lamellas anastomosantes vel contortas, nunc poros elongatos flexuosos referentes.—FRIES.

Hymenium sinuose. Sinuosities of the same suberose substance as the pileus, and not separable from it, firm, somewhat deep, various; in some cases resembling anastomosing or contorted lamellæ, in others elongated flexuose pores.

SPECIFIC CHARACTER.

DÆDALEA quercina; *dimidiata, ligneo-pallens, pileo suberoso, ruguloso, glabro, lamellis contortis implexis sinuosis.*—FRIES.

D. dimidiate, of a pale woody appearance, the pileus corky, roughish, glabrous; lamellæ contorted, sinuous, anastomosing.

DÆDALEA quercina, *Pers. Syn. Fung.* p. 500.—*Alb. et Schwein.* p. 237.—*Schwein. Fung. Carol.* No. 846.—*Hook. Fl. Scot.* Pt. 2. p. 26.—*Fries. Syst.* v. 1. p. 333.—*Nees, Syst.* t. 30. f. 227.—*Grev. Fl. Edin.* p. 398.

AGARICUS quercinus, *Linn. Fl. Suec.* 1241.—*Relh. Fl. Cant.* ed. 3. p. 544.—*Huds. Fl. Angl.* p. 622.—*Lightf. Fl. Scot.* p. 1028.—*Bolt. Fung.* t. 73. *fig. sup. e.*—*Sow. Fung.* t. 181.—*Batsch. Elench. Fung.* fasc. 1. p. 95.—*De Cand. Fl. Franç.* ed. 3. v. 2. p. 133.—*Ejusd. Syn.* p. 27.—*Winch, Bot. Guide,* v. 2. p. 93.—*With. Bot. Arr.* ed. 6. v. 4. p. 371.—*Purt. Midl. Fl.* v. 3. p. 247.

AGARICUS labyrinthiformis, *Bull. Champ.* p. 377. t. 352. et 442. f. 1.

AGARICUS dubius, *Schæff. Fung.* t. 231.

MERULIUS quercinus, *Gmel. Syst. Nat.* 2. p. 1431.—*Pers. Disp. Fung.* p. 26.

AGARICUS dædaleis sinibus excavatus, *Batt. Fung.* p. 72. t. 38. f. A. *et var.* nigricans, f. B.

AGARICUS quercus lamellatus, coriaceus albus, *Ray, Syn.* p. 24.

HAB. On trunks of old trees, chiefly Oak; and on old posts, &c. throughout the year. Frequent.

Pileus dimidiate, sessile, of a pale buff colour, and firm corky substance. The surface is marked with concentric lines, which are sometimes changed into prominent ridges, more or less rough, with little knobs and inequalities, but always glabrous, and having a woody appearance to the eye. *Hymenium* composed of large, deep, sinuous, irregularly

anastomosing lamellæ, of a paler colour than the pileus, entire and rounded at their edges. *Thecæ* very minute and slender. *Sporidia* minute, globose, white.

The form of the pileus is very inconstant. In general it is more or less semicircular, nearly horizontal, subentire, and the hymenium forming either a boldly convex or nearly straight line from the margin to the base, where the lamellæ are often two inches in depth. Sometimes numerous smaller pilei are attached inseparably together in various directions, and press one another out of shape. In like manner, the hymenium also varies, and sometimes permits the lamellæ to fall down like the folds of a curtain. The *flesh* is of a pale reddish-brown, darker than the lamellæ; and though of considerable substance in some specimens, in others is scarcely thicker than one-eighth of an inch.

In order to illustrate the genus *Dædalea*, I have taken the species which most frequently occurs. Though not rare, it is scarcely met with in the same abundance as ordinary fungi, and, when obtained, forms a beautiful specimen for the cabinet, as it preserves its form and colour in the most perfect manner. *Dædalea*, as a genus, is intermediate betwixt *Agaricus* and *Polyporus*. The lamellæ are sometimes nearly simple and regular; but still its firm and corky permanent substance, sufficiently removes it from the Agarics. But it is more difficult, as observed by FRIES, to define its limits on the side of the *Polypori*. The chief difference capable of being expressed in words, is the greater sinuosity of the orifices of the hymenium; for, though some species of *Polyporus* possess this character, it is generally in an old state, when in fact the pores are losing their proper character, as in *Polyporus abietinus*, already figured in this work.

Fig. 1. *A plant in its ordinary perfect state.* Fig. 2. *A few pilei become confluent.* Fig. 3. *A portion of a pileus, shewing a vertical section;* natural size. Fig. 4. *Transverse section of one of the lamellæ.* Fig. 5. *Thecæ and sporidia;* magnified.

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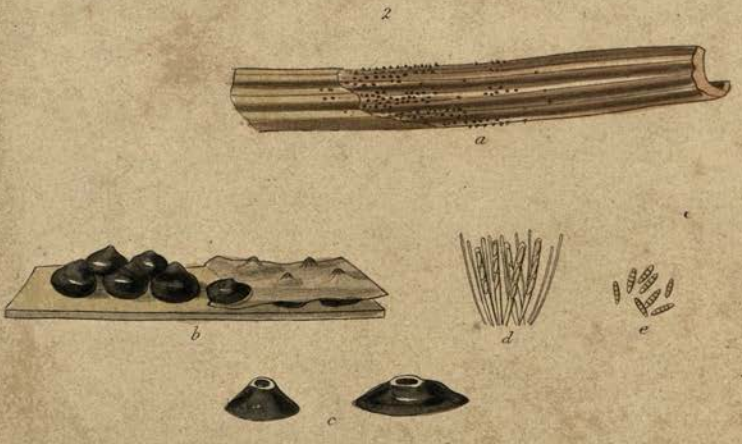
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CRYPTOSPHÆRIA ACUTA.

Flagon-shaped Cryptosphæria.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *HYPOXYLA, De Cand.*

GENERIC CHARACTER.

Receptaculum 0. *Sphærulæ duriusculæ sparsæ vel aggregatæ, sub epidermide insidentes, ore nunc depresso, nunc elongato, quandoque nullo; intus massa gelatinosa instructæ.*

Receptacle 0. Spherules mostly corneous, scattered or aggregate, lying beneath the epidermis, with the mouth depressed, elongated or wanting, containing a gelatinous sporuliferous mass.

SPECIFIC CHARACTER.

CRYPTOSPHÆRIA acuta; *gregaria; peritheciis subglobosis, lævibus, atris, nitidis, ostiolo rostellato, stricto, cylindrico, obtuso.*

C. gregarious; perithecia subglobose, smooth, black, shining, the mouth beaked, straight, cylindrical, obtuse.

CRYPTOSPHÆRIA acuta, *Grev. Fl. Edin.* p. 360.—*Baxter, St. Cr. Oxon. Exsicc.* No. 27.

SPHÆRIA acuta, *Hoffm. Veg. Cr.* 1. p. 22. t. 5. f. 2.—*Pers. Obs. Mycol.* 2. p. 70.—*Syn. Fung.* p. 62.—*Sow. Fung.* t. 119.—*Alb. et Schwein.* p. 33.—*De Cand. Fl. Franç.* v. 6. p. 133.—*With. Bot. Arr.* ed. 6. v. 4. p. 468.—*Relh. Fl. Cant.* ed. 3. p. 573.—*Winch, Bot. Guide*, v. 2. p. 108.—*Moug. et Nestl. St. Exsicc.* No. 181.—*Schum. Fl. Sælland.* v. 2. p. 157.—*Purt. Midl. Fl.* v. 2. p. 709.—*Schwein. Fung. Carol.* No. 152.—*Fries, in Vet. Ac. Handl.* 1817, p. 118.—*Scler. Suec. Exs.* No. 118.—*Syst. Mycol.* v. 2. p. 507.

HAB. On the dead stems of large herbaceous plants, in spring. Very abundant everywhere on Nettle stems.

Perithecia gregarious, situated beneath the epidermis, and as long as that remains, only exhibiting minute black dots, which are the protruding summits of the mouths. When the epidermis falls off, the perithecia are exposed, of a roundish or ovate, or somewhat conical figure, smooth, shining, very black, the mouth erect, straight, cylindrical, obtuse, often as long as the body of the perithecium. *Thecæ* long, mixed with *paraphyses*. *Sporidia* linear, attenuated at each extremity, 4–5 times articulated.

This little plant is very conspicuous after the epidermis of the stems has fallen; and to the naked eye its peculiar sharp appearance has doubtless suggested the name *acuta*, for under a magnifier, the apex is very obtuse. The resemblance of the perithecia to bottles of various forms is very striking.

Fig. 1. a, *Cr. acuta*; natural size. b, *Group of perithecia*. c, *Mouth of a perithecium*. d, *Thecæ, mixed with paraphyses*. e, *Sporidia*; magnified.

CRYPTOSPHÆRIA Doliolum.

Black constricted Cryptosphœria.

SPECIFIC CHARACTER.

Cryptosphæria Doliolum; *sparsa vel gregaria, peritheciis conico-rotundatis, nigris, nitidis, medio plicis 2–3, irregulariter transverseque constrictis; ore obtuso papilliformi.*

Cr. scattered or gregarious; perithecia roundish-conical, black, shining, irregularly and transversely constricted by 2–3 folds; mouth obtuse, papilliform.

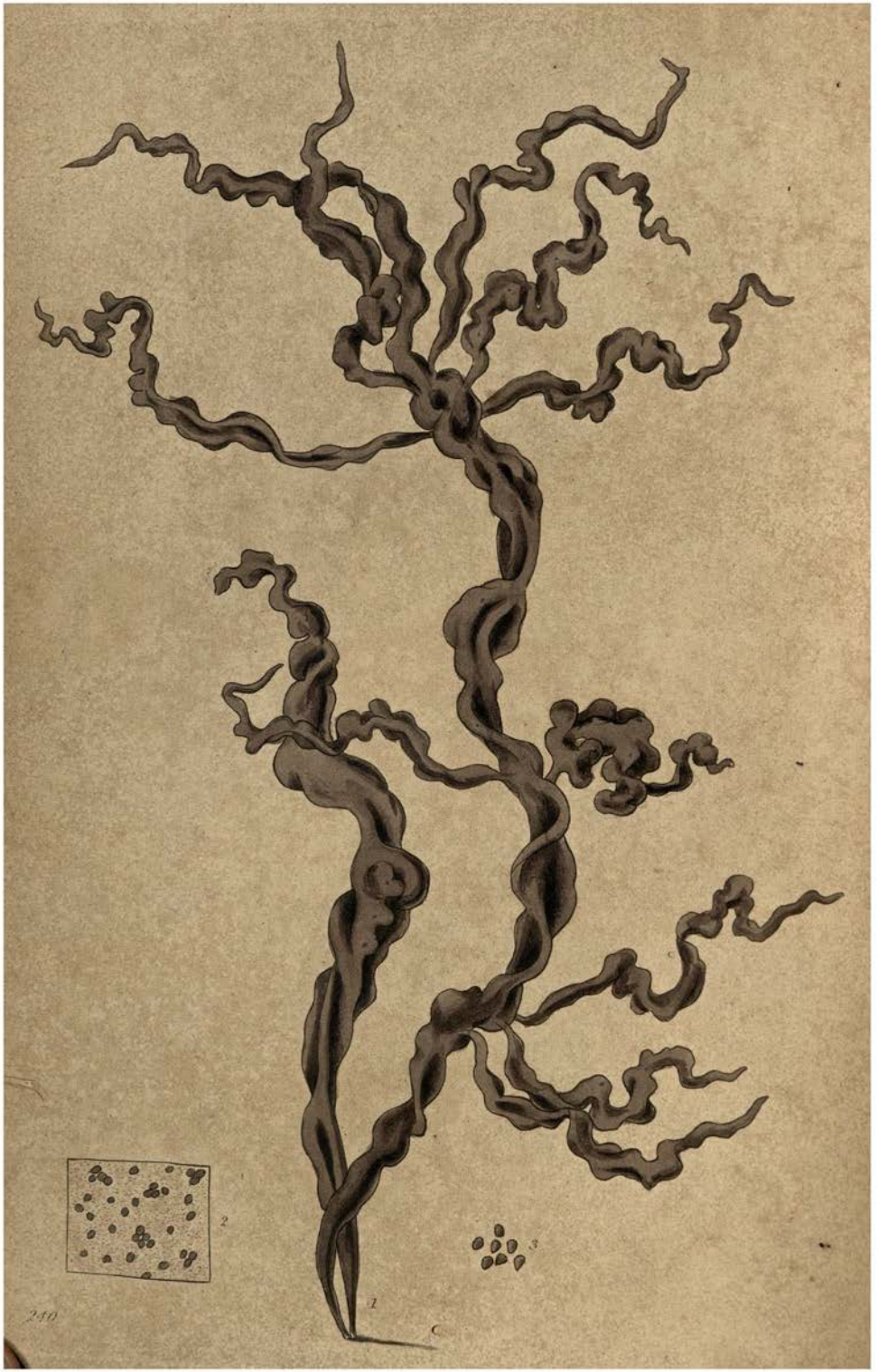
Sphæria Doliolum, *Pers. Icon. et Desc. Fung.* 2. t. 10. f. 5. et 6.—*Syn. Fung.* p. 78.—*Alb. et Schwein.* p. 40.—*Schwein. Fung. Carol.* No. 192.—*Hook. Fl. Scot.* Pt. 2. p. 7.—*Fries, in Vet. Ac. Handl.* 1817, p. 262.—*Scler. Suec. Exsicc.* No. 321.—*Syst. Mycol.* v. 2. p. 509.—*Holl. et Schmidt, Exsicc.* No. 33.—*Moug. et Nestl. St. Exsicc.* No. 571.—*Purt. Midl. Fl.* v. 3. p. 283. —*Grev. Fl. Edin.* p. 363.

Hab. On the dead stems of large herbaceous plants; especially near the root of the *Umbelliferæ*. Spring. Very frequent.

Perithecia mostly gregarious, sometimes scattered, very black, shining, between roundish and conical, with a papilliform obtuse orifice. In general, there are 2–3 transverse furrows, passing round the perithecia, giving the appearance of convex folds to the intermediate spaces. These furrows are seldom regular, and therefore the direction of the perithecia is not always vertical. *Thecæ* filiform. *Sporidia* linear-oblong, with 3–4 articulations.

What I have said regarding the production and situation of the preceding species, applies with equal correctness to the present one. It is, besides, often found along with it, but generally prefers the lower parts of stems.

Fig. 2. a, *Cr. Doliolum*, natural size. b, *Group of perithecia.* c, *Mouths of ditto.* d, *Thecæ.* e, *Sporidia.*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HALYMENIA PURPURASCENS; var. CRISPATA.

Purple cylindrical Halymenia; curled variety.

CLASS AND ORDER CRYPTOGAMIA ALGÆ, *Linn.*—NAT. ORD. *ALGÆ, Juss.*

GENERIC CHARACTER.

Frons plana vel tubulosa, submembranacea. Fructus: tubercula punctiformia laminæ frons subimmersa.—AGARDH.

Frond plane or tubular, somewhat membranaceous. Fructification: punctiform tubercles subimmersed in the surface.

SPECIFIC CHARACTER.

HALYMENIA purpurascens; *fronde membranacea filiformi, tubulosa, subpinnata vel vagè ramosa, ramis elongatis, fastigiatis simpliciusculis, basi attenuatis.*

H. Frond membranaceous, filiform, tubular, somewhat pinnate or irregularly branched, the branches elongated, fastigiate, mostly simple, attenuated at the base.

HALYMENIA? purpurascens, *Ag. Sp. Alg.* 1. p. 220.—*Grev. Alg. Brit. Exs.* No. 16.

HALYMENIA filiformis, *Ag. Syst. Alg.* p. 245.

CHONDRIA purpurascens, *Grev. Fl. Edin.* p. 290.

GASTRIDIUM filiforme, *Lyngb. Hydroph.* p. 68. t. 17.—*Fl. Dan.* t. 1664.

ULVA purpurascens, *Huds. Fl. Angl.* p. 569.—*With. Bot. Arr.* ed. 6. v. 4. p. 153.—*Hull, Brit. Fl.* p. 312.—*Woodw. Trans. Soc. Linn.* v. 3. p. 52.—*Smith, Engl Bot.* t. 641. *(non Gastridium purpurascens, Lyngb.)*

ULVA? purpurascens, *Hook. Fl. Scot.* Pt. 2. p. 92.

ULVA incrassata, *Fl. Dan.* t. 653.—*Ag. Syn.* p. 47.

ULVA spongiformis, *Fl. Dan.* t. 763. f. 2.—*Ag. Syn.* p. 47.

ULVA filiformis, *Fl. Dan.* t. 1480. f. 2.—*Wahl. Fl. Lapp.* p. 508. *(non Hudsoni nec Witheringii.)*

ULVA contorta, *De Cand. Fl. Franç.* v. 2. p. 10.?—*Ejusd. Syn.* p. 5.?

FUCUS contortus, *Gmel. Hist. Fuc.* p. 181. t. 22. f. 1.?

HAB. Attached to rocks and stones in the sea. Frith of Forth, abundantly. The variety figured, occurs opposite Seafield Baths, Leith. The species is also found on most of the British coasts. Summer.

Root minute, scutate. *Fronds* growing several from the same base, branched, 3–9 inches in length or more, mostly one to two-eighths of an inch in thickness, cylindrical, flexuose, attenuated at the base, and often also towards the extremities, continuous, smooth, membranaceous, gelatinous within, somewhat transparent, varying in colour from pale yellowish-red to dark reddish-purple; the *branches* are rather few, distant, spreading, generally simple, elongated, always attenuated at the base, often at the extremity, occasionally arising from near the bottom, but usually to-

towards the top of the main stem, arranged sometimes on two opposite sides in a pinnate manner, at others given off without much order, and more or less fastigiate. In old age becoming sometimes compressed, and rather rugose. *Fructification* naked, round, or pyriform granules, collected into irregular little groups, immersed in the substance of the frond, beneath the surface.

The extraordinary variety of *Halymenia purpurascens* now represented, is characterised by the frond being irregularly compressed, curled, twisted, and crisped in every possible direction, the general diameter being greatly enlarged, the substance very much firmer, and the colour much deeper. It is not an accidental appearance, as I could have gathered a thousand specimens when I first discovered it, and very many of them far more whimsical in their contortions than those in the plate. The water in which it grew was very shallow, but within the reach of every tide.

There can, in my own opinion, be no doubt, that *Halymenia filiformis* of AGARDH's Systema Algarum is the *Ulva purpurascens* of HUDSON; and as the latter name has the right of priority, I have preferred it. *Ulva filiformis* of HUDSON is certainly not our plant, though quoted by LYNGBYE. On the other hand, *Ulva filiformis* of WAHLENBERG and *Flora Danica* really belongs to it; yet WAHLENBERG quotes the wrong plant of HUDSON, along with the right figure in "English Botany," adding, however, to the latter, *haud Hudsoni*. It is probable that the *Ulva filiformis* of HUDSON, which seems to have created so much confusion, may be *Chordaria flagelliformis*, AG. (*Fucus flagelliformis*, TURN. Hist. t. 85.), as he states it to be *ramosissima*, which scarcely agrees with any state of our plant, and the branches themselves to be *longissimi*, a character which often does not agree at all.

I have quoted the *Fucus contortus* of GMELIN doubtfully. As AGARDH, however, does so without a question, he has probably authentic information on the subject. GMELIN's very rude representation might pass well enough; but when he says of the divisions of the frond, "planæ sunt, ad axillas subcontortæ, margine denticulatæ denticulis minutis, remotis;" and also "utrumque latus subundulatum," I cannot help thinking he may have had some other plant in view.

Fig. 1. *Fronds of Halymenia purpurascens v. crispata;* natural size. Fig. 2. *A portion of the outer substance of the frond, with granules.* Fig. 3. *Granules removed;* highly magnified.

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